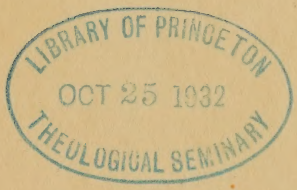

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Section

TEACHING PROCEDURES

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BY
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HOUGHTON MIFFLIN COMPANY
BOSTON · NEW YORK · CHICAGO · DALLAS
ATLANTA · SAN FRANCISCO
The Riverside Press Cambridge

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The Riverside Press
CAMBRIDGE · MASSACHUSETTS
PRINTED IN THE U.S.A.

PREFACE

THIS book is not divided into Parts, but it might easily have been. The first two chapters are introductory. Chapter I strikes the keynote of the book, and Chapter II sketches briefly the aim and objectives of education as a background for the objectives of teaching. The objectives of teaching, together with the basic learning procedures involved in them, are developed in Chapters III to XIV. Chapters XV to XXIII deal, in a general way, with classroom procedures, and Chapters XXIV and XXV with the measurement of the results of teaching, leaving, however, the consideration of standardized tests for a separate course.

The idea of direct attack in teaching, which is the dominating note of the book, has been with us for a long time in connection with foreign language instruction, but it is only now becoming generally recognized that the principle underlying it is equally applicable to all subjects. It is the master key to all effective teaching. Chapter II carries the analysis of the objectives of education a step farther than has heretofore been done in print. For my orientation in this field I am indebted to Professor M. V. O'Shea under whom I served as Assistant in Education during the year 1902–03. It had long been my intention to tell him personally of this indebtedness, but I have waited too long.

For the conception underlying the analysis of the objectives of teaching in Chapter III, I am indebted to the first five chapters of Bagley's *Educational Values*, where Bagley founds this unit on bed rock. For the seed-thought in reconstructing the Herbartian procedures in Chapters IV and V, I am indebted to Miller's *Psychology of Thinking*. These procedures

are basic in all problem-solving, whether this be inductive or deductive. Chapters VII and VIII, dealing with the organization of knowledge, derive their principles from logic, a subject that has long proved helpful to me. Logic has not yet emerged from the aridity of formalism and for that reason is disparaged by many; nevertheless, this subject has a great deal to give to teachers. Learning and understanding involve logic no less than psychology. Without a grounding in logic the theory of teaching and learning is bound to be vague and superficial.

The distinction between drill procedures and use procedures made in Chapters XII and XIII follows logically on the heels of a penetrating analysis of the objectives of teaching. The distinction clears up a great deal of confusion that has existed in the past.

Chapter XV, "The Learning Unit," forms the connecting link between the objectives of teaching and classroom procedures. For bringing this topic into new relief Morrison deserves full credit. Activity programs are viewed as a promising application of the principle of direct attack in teaching. The principles underlying intelligent study are identified with the principles underlying intelligent teaching. This unifies the teacher's task. Class instruction and individual instruction are viewed as being supplementary to one another, recognizing at the same time the importance of providing for individual differences. Tests and examinations are viewed as an integral aspect of teaching. They will constitute a stumbling-block to vital learning as long as they are treated as a hurdle set apart from teaching. The mastery conception in learning is related to the assignment of marks in the final chapter of the book.

The distraction of footnotes is avoided by making all references to a bibliography at the end of the book. The first number in these references refers to the date of the publication

and the second to the page. Thus (Dewey '10, 79) refers to Dewey's *How We Think*, page 79.

The exercises at the close of the chapters are frequently used as a means of curtailing the text. Topics involving principles that have already been developed and topics that are controversial and so would require considerable space for development are usually given as exercises.

It is a pleasure to acknowledge my indebtedness for many courtesies received from the members of the staff of the Department of Education of the George Washington University and from the members of the faculty of the Graduate School of Education of Cornell University with whom I had the privilege of being associated while the final draft of the manuscript was being prepared. My debt to the students in both of these institutions is no less profound. They have been a delight as well as an inspiration.

W. C. R.

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CHAPTER I

DIRECT ATTACK IN TEACHING

1. *The quest for method.* When King Ptolemy I of Egypt asked Euclid if there wasn't some easier way for him to learn geometry than by studying the *Elements*, Euclid replied: "There is no royal road to geometry." That was about 300 B.C. Even before that time mankind realized that there was no royal road to learning. Education, like all other good things, must be bought with a price, and that price is painstaking and persistent effort. Yet this effort need not be dull and meaningless. It may have been true in the time of Shakespeare that boys crept unwillingly to school, but this ought no longer to be generally true today.

For several centuries now educators have been seeking for a vital approach to learning and teaching. The sense realists thought they had it in the inductive approach, making liberal use of objects and pictures; Rousseau thought he had it by letting nature and native curiosity do the work, with a tutor in the background; Pestalozzi thought he had it in psychologizing education; our "progressives" think they have it in following the spontaneous interest of children. Only a few years ago some thought the secret was revealed in the socialized recitation; this was rapidly superseded by the project method; which in turn has given way to activity programs.

Now each of these people and movements, with many others, has found something. Vital attack in teaching involves not one formula but many. We have no more reason to expect to find one panacea in the art of teaching than in the art of healing. Vital attack is more like the entrances to a temple

which has many doors, any one of which leads to the interior. There is, however, one door, known as the front door, which leads directly to the main reception hall around which all the other rooms of the temple are arranged and from which they may be most readily explored. Similarly in teaching there appears to be a front door of approach which leads directly to the heart of the subject before us and from which all other aspects of the subject gain significance and interest. This is the method of direct attack.

2. *Direct attack.* The method of direct attack in teaching means that the attack is made directly on the objectives that one wishes to realize from a subject of study, not indirectly through definitions, rules, formulæ, paradigms, scaffoldings, and other technicalities. Typewriting, for example, is attacked from the start in the way it is to be used later in the office. The goal is automatic facility resting on the sense of touch with the eyes free to follow the notes or text. This attack yields a speed in six months that is about three times as great as that yielded by the older sight method. In fact, many who learned to typewrite by the sight method never acquired an automatic facility because they found it impossible to break the habit of looking for the right keys. Others took years to eliminate the habit. Looking for the keys becomes a scaffolding without which the operator feels lost, but which must be torn out if expert facility is to be acquired. The direct attack omits the scaffolding altogether.

The field in which the direct attack is at present receiving the most attention is foreign language instruction. The direct attack in this field is discussed in Chapter XII, to which the interested reader may turn. In this field the indirect attack, which is still the attack generally used in this country, actually erects a double scaffolding to interfere with the acquisition of automatic language facility. It uses both translation and

grammatical rules to get between the student and the language and ingrains habits that must later be eliminated if language control is to be acquired, which the vast majority, of course, never approximate.

There is no work more deadening anywhere in our school system than the foreign language instruction in our high schools and colleges, yet we appear here to be in the grip of a tradition that is next to impossible to break. The reasons for continuing the indirect attack appear to be primarily three. The first is tradition. Teachers teach as they themselves were taught. They know of no other method, or when they do learn of one they find themselves too inflexible to change. Second, the direct attack taxes the resources and ingenuity of the teacher to a far greater extent than the indirect attack and few appear to be equal to it. To lead people into a reading, speaking, and writing facility of a language is an altogether different thing from sitting back in a chair and hearing them recite grammatical rules or translate sentences. Third, the direct attack requires that the teacher have a ready control of the language himself. In our high schools especially, but to some extent also in our colleges, there are still many persons attempting to teach foreign languages who themselves cannot understand, speak, write, or even readily read the languages. These persons are obviously not in a position to use a vital mode of attack; but neither would a teacher of history, of literature, of biology, or of physics be in such a position without knowing his subject.

Physics has almost lost out in our high-school curriculum because of the formal method by which it has been attacked. It is almost everywhere approached through exact measurement, definitions, formulæ, mathematical problems, and routine experimentation. Not long ago I heard two high-school teachers of physics discussing the difficulties that their students

were meeting in the subject. Said one: "I know why students find physics so hard; they do not come well enough prepared in mathematics. We must insist that only those who are well up in their mathematics get into the course."

If that is the best diagnosis they have for the ills of physics, they are not going to save their patient. If physics is to be made significant and educative, the first course in the subject must attack physical phenomena directly, paying only minor attention to mathematical relationships. Mathematics is the grammar of physics and has no more right to obtrude itself at the start than grammar has in foreign language instruction. Children need to become acquainted directly with machines, with sound, with heat, with light, with electricity, and with magnetism. Laboratory work in the first course should resemble nothing more closely than well-directed play. Let the children begin by working quite informally with levers, pulleys, inclined planes, cog wheels, sound transmission, toy engines, and electrical appliances. Let them get shocked by the static machine. Don't be forward in calling for scientific explanations and the students will surprise you by beating you to it. They don't relish being left in the dark. Children fairly insist upon being given explanations of phenomena, once these have been brought adequately into their experience. Even mathematical relationships will soon be found illuminating. Why is it that the lever, the inclined plane, and the pulley give you an advantage? Are you getting something for nothing or must you pay for your gain in power? What, and how much?

Next the direct attack in physics demands that the class visit and learn to understand machine shops, factories, printing establishments, engine rooms, power houses, telephone exchanges, and broadcasting stations. All these things, and others, must be interpreted through the study of physics and their place in the processes of our life must be made clear.

That is what the introductory cycle of physics is. In the second or college cycle, which should be tempered to the needs of physicists and engineers, exact measurement, precise experimentation, formulæ, and problems have the right of way, but to be meaningful, such a course ought to rest upon one like the preceding. For the first course, no matter when it is given, technicalities have no meaning, for they have nothing to rest upon. In the second course these technicalities and relationships form the substance for direct attack.

The direct attack in literature, art, and school music is treated, by implication at least, in Chapter X, and the direct attack in the social sciences is implied throughout in Chapter XI. Even though the term does not always appear, the principle of the direct attack hovers in the background of the discussion in every chapter. The direct attack is not restricted to the attack on something concrete, such as the phenomena of physics or the plant and animal life in the community, but embraces any objective that is significant and that the student is ready to master. This may be a skill as in typewriting, appreciation as in literature, or an understanding of the theory of relativity.

In gaining mastery over the direct attack, the teacher must learn to bring the significant and interesting realities of his subject before the students first, and from there lead into a consideration of relationships, rules and formulæ, if that seems necessary. In literature, art, and music this is usually not necessary, neither is it always necessary in the first cycle of natural and social science. We have just seen this movement from realities to relationships in physics and it is brought out also in respect to school music in Chapter X and in respect to foreign language in Chapter XII.

A few years ago a young woman with an interest in amateur dramatics wished to bring her topic to the attention of one

of my classes with the idea of interesting the students in her hobby. I gave her permission. She started in by telling them why they should participate in dramatics: it was good for their personalities; it developed their self-confidence; it gave them the ability to appear in public; it developed grace of carriage; it taught them to enunciate properly; and so on. She hadn't talked five minutes before they were all hopelessly bored, and instead of interesting them in dramatics, she repelled them. Why? Because she started her exposition at the wrong end. What she should have done first was to depict a few striking instances of amateur dramatics; tell them of a few actual accomplishments, and of the trials and tribulations, and of the ultimate successes and satisfactions, that came to the participants. That would have been something for the minds of the young people to hold on to and to grip their imaginations. She might then have gone on to point out a few of the values that accrue, but that would have been hazardous. Unless done very skillfully it would have resulted in an anticlimax. All these values were already implicit in the presentation and in the esthetic field they are most effective when left in that state.

3. *Subject-matter.* The method of direct attack implies a conception of the subject-matter that extends distinctly beyond the confines of a textbook. In fact, the textbook assumes a position in teaching essentially like that of the guidebook in travel. The subject-matter of physics is the actual phenomena and forces of mechanics, sound, heat, light, and electricity, that occur all about us, together with the uses that man is making of these forces. In botany it is the plant life about us and the rôle that this life is playing in our civilization. In history it is the past drama of man and his institutions, with the light that these throw on the drama and institutions of our own time. In literature it is the depiction of man's life — its comedies,

tragedies, defeats, and aspirations — as seen by our literary artists; and so on with every other subject of study. Even mathematics is not in books. The things to which it relates, whose relationships it interprets and enables us to control are all outside of textbooks. To all those realities our various textbooks serve as guides, and for the pupils the teacher is the personal guide to these realities.

Studying a book need not be studying at all; it may be a mere memorizing of words that mean next to nothing. It happens altogether too often that students have passed biology in high school and yet know but few, if any, more of the plants and animals in their environment than they did before; that they have passed physics, but know little more of the actual working of our physical contrivances than the child in the grades; all that physics stands for to them is a lot of abstract formulæ and meaningless problems.

The subject that appears to be most meaningless to students is mathematics beyond arithmetic. This is because the subject means nothing to many of the teachers. In talking individually with two high-school teachers of mathematics recently, I was considerably surprised to find that even they had not stopped to think of the life relationships of mathematics. They assumed that the subject was in the curriculum to furnish a means for giving mental discipline. They had specialized in mathematics because they liked the subject, which meant that they enjoyed manipulating the symbols and having them come out just so. How mathematics is serving humanity, how and when it is being used as a tool, and what processes and relationships it may interpret for us they had not thought of as being a part of mathematics. They were teaching mathematics, but they were not using it as an educational instrument. Unless mathematics can be made to serve this interpretive function, it has no place in general education, no matter how valu-

able it may be as a tool in the hands of a few technical specialists. To serve this interpretive function a new course will no doubt have to be organized, as is now being attempted in some places.

For this deficiency in subject-matter on the part of our teachers, our college teaching, our teacher-training institutions, and our state departments of education must share the blame. Too many college teachers have failed to acquire a functional conception of what they are teaching, teacher-training institutions are emphasizing pedagogy at the expense of subject-matter, and state departments of education are demanding an ever-increasing array of educational courses for certification purposes with subject-matter courses all but crowded out.

Courses in education, excellent though they may be, can be of little avail without a rich and meaningful fund of subject-matter to which they may be applied. It is subject-matter that is the first major for all teachers, whether they are working in the classroom, as supervisors, or as administrators. Without it, the teacher has nothing to teach, the supervisor nothing to supervise, and the administrator nothing to administer. The school system exists for the vital and meaningful transmission of subject-matter, rightly conceived. The various subjects that we teach are nothing less than interpretations of the various aspects of this world and civilization in which we are living, or of our relations to it, and it is the function of the school to induct the rising generation into this civilization.

It is not to be expected that the beginning teacher in any field will know everything that is to be known in that field. Of far greater importance than the amount he knows is the way in which he knows what he does know. A few far-reaching relationships functionally conceived and grounded in reality go vastly farther in teaching than an infinite fund of book learning, verbalistically mastered, and unrelated to life. The

teacher who has the right start will soon be a master in his own and collateral fields and he will soon be teaching as one having authority. To teach with authority one needs only to know what the things that he is dealing with actually are and what their significance is in life.

4. *Pupil participation.* Along with the reality of subject-matter, the direct attack in teaching implies the interested and active participation of the pupil in school tasks. From the standpoint of teaching, subject-matter and learning activity are two halves of one whole, useless each without the other. Just as there is always a tendency for subject-matter to become dead and verbalistic, so there is a tendency for learning to become formal and memoriter. Teachers must ever be on the alert to guard against both. A vital philosophy of education and teaching should aid in doing this, but, going one step farther, some ways and means of supplementing the textbook in the direction of reality are pointed out in Chapter XVII, and ways of enlisting pupil activity are pointed out in Chapter XVIII. Interest in learning, or the principles underlying motivation, are taken up in Chapter XIX. Children must have something real and significant to learn and they can learn best by attacking the realities themselves, either in the concrete or through a meaningful representation, by means of activities that are whole-hearted and engaging.

5. *The art of teaching.* Teaching is an art, and the perfection of every art is a slow process. Principles, such as those given in this text, may be helpful in perfecting an art; in fact, that is what the principles brought together in an applied science are for; but principles do not apply themselves. In the early stages of intelligent practice, guiding principles will seem to be more of a handicap than a help. They will be eternally getting in the way, like a thimble in the early stages of sewing. Not until the theory has been incorporated into

one's personality and begins to function automatically will the practitioner gain the full benefit from it. The teacher who has attained the master stage of his craft is least conscious of theory when intently at work, but to attain to that stage takes patience, practice, and self-discipline.

Educational theory can, and usually does, make teaching intelligent, but this is not synonymous with making teaching efficient. For this an additional factor, an inborn knack for teaching, is also required. This knack can be improved by theory, combined with practice and kindly criticism, but without this knack the returns from theory and practice, even in the presence of high mentality, are meager. Teachers are not born *or* made; they are both born *and* made; but this is true also of every other calling. Granted equal and adequate mentality, the graduates of the same medical school, the same law school, or the same art school are not equally successful. What people are able to do with theory depends largely upon gifts that they are born with.

Fortunately, when one has a meager endowment of gifts in one direction, he may have a richer endowment in another direction. The genius of Shakespeare and the genius of Newton may have been equal in amount, but whether they were or not, there is no doubt about the fact that they pointed in different directions. It is quite conceivable that no amount of mathematical training could have made Shakespeare a great mathematical physicist, or that a lifelong contact with the theater would have made Newton a great dramatist; but this is no argument against training. Shakespeare needed the theater for his talents to impinge upon and develop, and Newton without mathematics could probably have made no mark in science. The person with a high native endowment for teaching will go a long way even with a modicum of training, while the person with little native endowment for this

calling will seemingly gain little or nothing in teaching skill even with the best of training; yet he might quickly become an outstanding figure in some other calling. Without minimizing the significance of training in the least, this indicates nevertheless the important place that guidance and selection occupy in the preparation for any calling. First make sure that you are on the right road, then go courageously ahead, confident that the laurel of success will crown your efforts.

EXERCISES

1. What is meant by the statement that education is a science?
2. How may one determine his fitness for teaching, or for any other calling?
3. What are art, pure science, and applied science? How are they interrelated?
4. How may teachers be helped to greater mastery over the subjects they teach?
5. What is professionalized subject-matter? Is academic subject-matter for teachers different from what it is for physicians, lawyers, or merchants?
6. Point out how you would use the method of direct attack in botany; civics; history; art; algebra; grammar. What is the real subject-matter in each of these?
7. What percentage of teachers that you have had do you consider as having been genuinely successful? Unsuccessful? List the traits that caused success and those responsible for a lack of it. Which of these traits were due to nature and which to nurture?

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CHAPTER II

THE AIM AND OBJECTIVES OF EDUCATION

1. *The problem.* To decide whether or not Latin should be admitted to the curriculum is one thing; to decide what we should lead our students to get out of Latin after it has been admitted to the curriculum is another thing. The first is a problem in educational objectives and the second is one in teaching objectives.

This book is concerned primarily with the teaching objectives and means of realizing them, but it assumes the existence of educational objectives which frequently obtrude themselves into the discussion. A full consideration of these objectives belongs to the course in the principles or philosophy of education, but we must treat the topic briefly so as to have a common background for the evaluation of objectives in teaching as we proceed through the topics of this course.

2. *Statements of aim.* The objectives of education get their sanction from what one conceives to be the aim of education. In recent years there has been little disagreement about the nature of this aim, although in the wording of it much diversity in tastes and points of view is revealed.

Herbert Spencer is the person who deserves the credit of directing the attention of modern educators to the problem of the relative values of knowledges. He did this in his book entitled *Education*, published in 1860, a book that has become a classic and is still well worth reading. "To prepare us for *complete living* is the function that education has to discharge" ('60, 31)[1] is the way he states the aim of education. He inter-

[1] These numbers refer to the bibliography at the back of the book. The first number gives the date, the second the page of the publication.

prets this to mean balanced or harmonious living by participating evenly and intelligently in the various departments of life. This statement of the aim is still current in some quarters.

Bagley ('05, 60) stated the aim of education as the production of the *socially efficient individual* and interpreted this to mean: (1) that the person should be equipped to "pull his own weight"; (2) to interfere as little as possible with the efforts of others; and (3) to further social progress. This formulation has become widely current.

Nicholas Murray Butler ('98, 17) stated the educational aim to be the gradual *adjustment* of the individual to the spiritual possessions of the race. This formulation, which harmonizes with biological conceptions, is usually stated as the adjustment of the individual to his environment and appears at present to be more widely current than any other. Chapman and Counts ('24, 11) interpret this formulation to mean the "method of assisting an initially ill-adapted individual to cope with the ever-increasing complexities of the world."

Before the early years of the twentieth century a widely accepted conception of the purpose of education was *mental discipline*. It was assumed that when a person's mind had become well disciplined through the pursuit of a rigorous course of studies he was then fitted to cope with any of the problems of life that he might be called upon to face. From the standpoint of the training or disciplinary effects that education should have on the personality, this conception contains much that is true, but as an adequate formulation of the aim of education it has long since been discarded by educators, although in the minds of the lay teachers it is still naïvely current to some extent.

3. *Relation of content and formal aims.* We have mentioned

the idea of formal discipline, not to discuss it fully, but to bring out two points that teachers need to bear in mind in respect to the aim of education. These are: (1) that one's conception of the aim of education may greatly influence one's teaching, and (2) that education has two aspects, objective and subjective, that must both be borne in mind when thinking about education if confusion is to be avoided.

A teacher who is dominated by a contentful or objective conception of the aim of education is likely to teach quite differently from one who is dominated by a formal or subjective conception. The former will place his emphasis primarily on the knowledge in hand and on its functions, while the latter will place it on the mental training to be derived from the acquisition and handling of this knowledge. The former will teach physics, for example, so as to interpret the physical forces in the environment for his pupils and so as to give them an insight into the ways in which these forces are being used. He will lead his pupils to gain a first-hand acquaintance with the phenomena of mechanics, sound, heat, light, electricity, and magnetism, and of how these function in machines, engines, microscopes, power houses, the telephone, the telegraph, the radio, and so on. The latter will teach physics as if it were primarily a mathematical discipline. He will have his pupils memorize laws, rules, and formulæ and will lay great store by having them solve problems that embody these abstractions. His claim is that he is leading his pupils to think; to exercise their minds. He uses every subject as a means of mental gymnastics and his teaching throughout must be characterized as formal.

It is obvious that the student taught from the contentful standpoint gains a more interesting and vital understanding of his environment than the other, but it also appears to be true that he gains in the end a better mental training. A contentful

conception of teaching, adequately conceived, embraces the formal or subjective aspect.

Mindful of both the objective and subjective aspects of education, the writer in 1910 wrote, "To educate a person means to adjust him to those elements of his environment that are of concern in modern life, and to develop, organize, and train his powers so that he may make efficient and proper use of them" ('10, 39). Down to the first comma this statement refers to the objective or social aspect, and the remainder refers to the subjective or psychological aspect. In general, the former gives rise to the educational objectives and the latter to the teaching objectives. When Thorndike ('12, 2) defined education as "the production and prevention of changes in human beings," he had teaching, and not educational objectives, in mind.

4. *The satisfying life.* All the statements of the aim of education that we have given refer in some manner to the life in which we find ourselves. It is the function of education, not to take us out of that life, but to equip us to live efficiently and happily in it. It is, as has recently been said, the purpose of education to fit young people to do better the things that they would do anyway. This brings education right home to the art of living. In a good sense, we all want to get out of life as much as we possibly can. Thorndike and Gates, viewing education from this angle, have stated the aim of education to be "to secure the fullest satisfaction of human wants" ('29, 18). When it is seen that many of our wants are satisfied, not by getting, but by giving, and that what we get out of life depends largely upon what we put into it, this viewpoint need in no way be disquieting.

Our wants are set by our inborn powers and functions, modified by educational influences. We can satisfy them only by participating broadly and actively in the life about us, pay-

ing heed to the rules and regulations that the perpetuation and improvement of this life inherently demand. All that this calls for is a life that is typically and vibrantly human, a life that fits our various natures. In this life the absence of strife and friction is not called for. Some of these should be eliminated, not only gently but vigorously, wherein we find one of our opportunities for action, but others are signs of growth and we may always expect to find them in a life that is vigorous and satisfying. When one of these has been adjusted, which may usually be done with gentleness and reason, another is sure to crop out somewhere else. That is the price of growth.

5. *Lists of objectives.* What are the aspects or departments of life in which one needs to participate in order to secure the satisfaction of his powers and for which it is the function of education to prepare the rising generation? The answer to this question involves an analysis of life itself. The aspects and elements of this life are so interwoven that it is often difficult to tell which are primary and which are secondary. The philosophers throughout the ages have battled with this analysis.

William Paley (1785, 15), an English churchman writing at the time of our Revolutionary War, approached the problem with the question, What are the factors in happiness? He divided his answer into two sections, (1) what happiness does not consist in and (2) what happiness does consist in. We have space here only for the outlines of his discussion.

Happiness does not consist:

1. in the pleasures of sense;
2. in an exemption from pain, labor, care, business, suspense, molestation, and "those evils which are without";
3. in greatness, rank, or elevated station.

Happiness does consist:

1. in the exercise of the social affections;
2. in the exercise of our faculties, either of body or mind, in the pursuit of some engaging end;
3. in the prudent condition of the habits;
4. in health.

Herbert Spencer ('60, 32), apparently uninfluenced by Paley, has given us an analysis of "the leading kinds of activity which constitute human life" as follows:

1. Those activities which directly minister to self-preservation.
2. Those activities which, by securing the necessaries of life, indirectly minister to self-preservation.
3. Those activities which have for their end the rearing and discipline of offspring.
4. Those activities which are involved in the maintenance of proper social and political relations.
5. Those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings.

The list of objectives that has been most widely current in recent years is the one formulated by the National Education Association's Commission on the Reorganization of Secondary Education and published in a pamphlet entitled "Cardinal Principles of Secondary Education." The list is as follows ('18, 11):

1. Health
2. Command of fundamental processes
3. Worthy home membership
4. Vocation
5. Citizenship
6. Worthy use of leisure
7. Ethical character

This list was formulated from the restricted standpoint of

the objectives of the high school and so contains one factor, the second, that would not normally appear in such a list. This refers to subject-matter instead of an aspect of life and so may be omitted from further consideration.

There are many other lists, but these three will serve as a basis for our discussion. When these are compared, one is impressed with their similarities. When the differences in wording are allowed for, they all contain the factors of health, vocation, and homemaking. Spencer and the N.E.A. list contain also citizenship and leisure activities. In Paley, the pursuit of an engaging end embraces both vocational and avocational activities, and by implication it may cover also citizenship, although this factor Paley did not adequately provide for, probably because the opportunities for political expression on the part of the masses were few in Paley's time. This leaves only "prudent habits" and "ethical character" out of line. From a logical angle these are actually out of line, as is the case also of "health," even though this is included in all three lists and in many others.

The confusion that we find in the various lists of educational objectives results from the failure to distinguish the objective and subjective aspects of life and of education. This may not be disturbing except to students who have "a taste for order in ideas." A college student of education may fairly be expected to think this matter through consistently and we shall therefore proceed with a systematization of these objectives.

6. *The objectives systematized.* To be logically consistent the effects of education must be viewed alternately from two standpoints: (1) from the standpoint of the changes that education can make in the individual, and (2) from the standpoint of the purpose for which these changes are made.

The changes that education can make in an individual may be summarized by the following outline:

- I. Subjective changes
  - 1. Physical — health, development, etc.
  - 2. Mental
    - *a.* in intellect — knowledge and procedures
    - *b.* in feeling — tastes, ideals, attitudes
    - *c.* in motor responses — habits, acts of skill

The factors of health (1), of ethical character (*2b*), and of habits of deportment (*2c*), are adequately covered in this outline. These are important and teachers should be mindful of them, but they are not pursuits in life as are vocation, avocation, homemaking, and citizenship. They are the subjective conditions on which the efficient pursuits of the objective factors rest. We want health, character, a system of habits, and knowledge plus a disciplined intellect so that we may be efficient, reliable, and progressive in the objective pursuits of life.

The objective purposes of education may be summarized as follows:

- II. Objective purposes
  - 1. General
    - A. Social aspect
      - *a.* Citizenship
      - *b.* Homemaking
    - B. Personal aspect
      - *a.* Personal enrichment
      - *b.* Leisure activities
  - 2. Vocational

The items in each of these outlines could easily be divided further, and they should now be discussed, but to do this adequately would require many chapters. We must content ourselves with a brief discussion of the objective factors.

7. *Vocational education.* Vocational education has in itself in recent years become so large a field that the treatment of its general features alone would require a volume. The teacher of general subjects may well know something about vocational education, but it appears to be coming more and more evident that vocational and general education cannot be mixed to any great extent. The spirit of each is different. It always has been different and we may expect that it always will be different. The equipment for trade schools and for professional schools does not in the main fit in with the equipment of general culture schools, neither is it always easy to dovetail the school day and the class periods of the two schools together.

Training for teaching has always affiliated well with general education because knowledge is the teacher's chief stock in trade, and this affiliation for teachers of general subjects may well continue.

Home economics taken for general homemaking purposes may be regarded as a general subject, for as such it is needed by fully one half of the population. The situation here is complicated because, in colleges especially, this subject is taken also for specific vocational purposes outside of the home. This tends to give it an equivocal status.

8. *General education.* General education may be just as specific in its objectives as vocational education. It is general not in the sense of being vague, but in the sense of dealing with topics that are of concern to all people alike, usually outside of specific vocational uses, but not necessarily. Reading, writing, and arithmetic, for example, are needed in vocational life by all, no less than they are needed in social and political life by all.

The specific purposes of general education are determined by those aspects of life in which all people should participate or bear responsibilities. In a republic like ours, political

responsibilities, social welfare responsibilities, homemaking responsibilities, and recreational and avocational opportunities are theoretically of equal concern to all, and all should therefore be equipped to participate in them intelligently.

9. *Citizenship.* The responsibilities of citizenship may be divided for clearness of understanding into (1) political responsibilities and (2) social welfare responsibilities. The problem in each is to determine what life demands and then equip the rising generation to meet those demands.

Political responsibilities are those that have to do with the maintenance and the improvement of the government. They include voting, attending caucuses and conventions, political discussion and the shaping of policies, the payment of taxes, military service in time of need, and office-holding. The responsibilities in a republic are inherent in the nature of the government. To side-step them is to fail in one's political duties, for they are the equal responsibility of all over twenty-one years of age. For the government to go on, some people must assume them in the constitutional way. The only alternative is the arbitrary assumption of authority by a tyrant, however benevolent he may be.

Political science, economics, history, and geography are the means of gaining a clear understanding of these responsibilities, but the function of the school goes far beyond the inculcation of this understanding. It is the function of the school also to develop dependable citizenship attitudes and to initiate the rising generation into citizenship activities. It is the last of these obligations that the school is now failing most to meet. Our young people are taught a good deal about political life, institutions, and responsibilities, but it appears to be the duty of no one to initiate them into these responsibilities. Young people are coming of age and are beginning to vote with no one to take any systematic and enlightened interest in their new-

found privileges. At twenty-one there might well be a solemn graduation into political citizenship for all, but not without much more specific education and training than is now the case.

Initiation into political citizenship implies the affiliation of young people with the political parties of their choice. Classes in government in college might well make such affiliation a requirement in the course. This may be looked upon as the laboratory phase of the work. The instructor would need to know the political situation in his community and be in vital contact with it. It would be his duty to see that the young people became properly connected with political parties and to assist them in getting started in attending caucuses and conventions. These caucuses are now in the hands of a few; the vast majority of the people never come in contact with them. It is here that we find one of the weakest links in our political chain. We must either strengthen this link or develop a class of civil servants who will as their profession develop our government from the ground up, the rest of us casting a vote, perhaps, on the adoption of the larger policies. That would simplify matters and should give us a more efficient government, but it would rob us of much of our democracy with all the privileges and opportunities that this implies. The only rational alternative, however, is to get people generally to participate in all phases of political activity, and the only way to bring that about appears to be to initiate them overtly into these activities when they become of age.

It should be recognized that voting is only the end point in political activity and often embraces the least important fraction of it. The important part is the determination and formulation of what shall be voted upon and who the personalities shall be to enact the policies into law or carry them into effect. Once these policies have been formulated and the

nominations made, voting in many communities is quite a secondary matter.

I recognize, of course, that the colleges reach only a small percentage of prospective voters and that high-school students are too young to vote, so that this institution can do nothing directly toward initiating young people into political life. In respect to this group the burden is one that has to be assumed by evening and extension schools. Young people becoming of age during any year, who are not in a class on government elsewhere, could be required to meet two or three evenings a week for one school year for instruction and discussion and then placed in charge of interested adults during the next year for full initiation into political life. Without the initiation the instruction would be of little avail.

Social welfare responsibilities include such things as participating in civic improvement associations, community associations, charitable organizations, parent-teacher organizations, and religious organizations. These are essentially voluntary in character; the government would not collapse even if they all disappeared; but life would become a hard, inhuman affair without them. Community civics and sociology are the subjects that furnish the major portion of the enlightenment in this field. Wholesome attitudes are as essential as enlightenment, and participation is again the culmination without which the knowledge and attitudes would amount to little.

Participation in social welfare responsibilities is in the main easier than it is in political responsibilities and no one has to wait until he is twenty-one before he can be initiated. Young people should be led to realize that they are their brothers' keepers; that, in but a slightly limited sense, they are citizens now; and then they should be led to act on these realizations. They can do this through their own organizations or by joining

the organizations of adults. An example of the type of activity here meant is described by Dunn ('15, 32):

> While the children in Indianapolis were studying questions relating to public health they became much aroused over the existing conditions of sidewalks, street-cars, and other public places because of the violation of the ordinance against spitting. As usual, they wanted to do something about it. Many (like their elders) wanted to complain of the situation — complain to the street railway authorities, to the board of health, to the mayor, to the police. Discussion, however, led to the conclusion that it was difficult to place responsibility in any one spot, and that, anyway, mere complaint seldom accomplished much. Some proposed speaking to the offenders. Others thought that this would be too officious and might expose children to abuse. Various methods of procedure were thus discussed. Finally the conclusion was reached that there was no reason why street railway authorities should *want* dirty cars and that there must be difficulties in the way; therefore let a committee be appointed by the proper authority (which they decided should in this case be the superintendent of schools) to inquire of the street railway authorities what their difficulties were and to offer the assistance of the children in any way that seemed feasible. This step ultimately led to a general movement in which the street railway officials, the board of health, many civic organizations, and the newspapers united, ending in a successful campaign for health and cleanliness. The children's participation consisted in three things: They initiated the general movement through the proper channels; they helped form public opinion; and they themselves observed the law against spitting.

In a similar manner public school pupils have coöperated in the extension of playground facilities, clean-up, anti-fly, and anti-mosquito campaigns, and many others. The usual way now of assisting in charitable enterprises is by donating money that is then administered by paid social workers. This leads to greater efficiency, but it removes from charitable work the

personal and sympathetic touch. It is well for the heart of everyone to keep in direct contact with at least one line of humanitarian activity, being careful the while not to let his left hand know what his right hand is doing.

10. *Homemaking.* The taproot of human life is the home. This is the institution around which all the other institutions revolve and for which they ultimately exist. It is in the home where friends and relatives foregather; where the life of the race is renewed; where the high privilege of caring for the infant and of receiving his affection may be experienced; where one may assist in and enjoy the development of children from infancy to manhood and womanhood; where all the members of the family are fed, clothed, and sheltered; where they may participate in the confidences and the endearments of the heart, and from which they may go out and to which they may return. Be it ever so humble, there is no place like home.

Of all the basic social institutions, the home has received the least attention in the school. The young are instructed in the nature of the state and are inspired to become active and patriotic citizens; they are instructed in their economic relations and are helped to become efficient in their vocations; they are encouraged to join the church and through it to participate in humanitarian affairs; in late years they have been impressed with the importance of avocational pursuits; but they are allowed to gain a knowledge and appreciation of the home in the main incidentally. Few take courses directly pertaining to it in high school and fewer still in college.

Our departments of home economics throughout the range of education have in recent years adopted an enlarged point of view and are rendering noble service. In the elementary school, where only beginnings can be made, they have received fairly adequate recognition, but in the high school and the college, where the heart of their work must fall, they have

not achieved the position that the importance of the home suggests. No young woman should go through these schools without having her vision opened in respect to the home, for, whether married or not, few women escape the obligation of home management. Enlightenment in respect to the social and financial aspects of the home is of equal significance to the young man. The details of what needs to be taught must be left to special methods courses. There are technical phases, to be sure, but the backgrounds must be found in biological science, chemistry, physics, economics, sociology, and art.

11. *Eugenics.* A topic vitally related to the home and social welfare is the topic of eugenics. In respect to the quality of its stock, the Teutonic branch of the race appears to be going downward instead of upward. It has been true so far throughout history that no branch of the race in western civilization has been capable of surviving success. As long as the city-states of ancient Greece were struggling upward, the birth-rate among all classes remained adequate and competent leaders were abundant, but as soon as conditions of culture, comfort, and freedom were attained, the race began to die from the top. The competent classes ceased to reproduce their numbers and the race was recruited from the less competent, sinking correspondingly in caliber. In Rome the situation was closely similar. After the Cæsars, marriage became unfashionable, home life disintegrated, and the race declined. The Teutons appear now to be where the Greeks were in the time of Pericles and the Romans in the time of the Cæsars. Will the Teuton suffer the same fate, or will he be able to apply to himself the knowledge that he is able to apply to plants and the lower animals and thus check the decline of his stock and even raise it to higher levels?

The fact that points to the conclusion that the Teutonic race has begun its downward course is the selective decline in

the birth-rate. People in the humble walks of life still have families of adequate size, often generously large, but the educated classes and those who have wealth and leisure are no longer reproducing their own numbers. Of the graduates of our women's colleges barely one half marry at all and these have on the average only about one and one half children apiece. The graduates of men's colleges do but little better. Barely eighty per cent of these marry and they have on the average about two children apiece. The situation in every professional group, with the possible exception of the ministry, is closely similar.

Superficially one might think that an average of two children per family is enough to keep the group even. This would be true only if conditions were ideal. Every child would have to live through middle life, every child would have to be normal in health and ability, and everyone would have to marry and bring to full maturity at least two children per family; but such ideal conditions nowhere prevail. People die not only in old age, but all the way from infancy to old age. Averaging all groups, about ten per cent remain permanently unmarried and an equal percentage of those who do marry have no children. In professional groups this percentage runs up to twenty or twenty-five per cent.

To make up for these losses, the average number of children per fertile family must be close to four. We must learn to look upon four children as an average-sized family, and of less than four as a small family. For every family with less than four, there should be one *in the same group* with correspondingly more than four. This average will only keep the race or group even. If a group is to grow the average must be more than four.

When the eugenicist says that the size of family in the more competent groups needs to be increased if our race is to main-

tain its position, he is not arguing for a wholesale increase in the birth-rate; far from it. Among the less competent groups the problem of decreasing the birth-rate is just as urgent as is the problem of increasing it among the more competent. An average of four children per family throughout the range of society is the goal to be desired.

Why is our race dying from the top? Why are the more competent and cultured groups not reproducing their own numbers?

What can education do in helping to remedy the situation?

A full exposition of this problem belongs to the principles of education, yet it is appropriate here to raise the following questions for class discussion:

What can education, in coöperation with the medical profession, do in respect to the factors of health and sterility?

Can, or should, education do anything with the factor of personal convenience or selfishness?

What can education do to develop an adequate appreciation of home and family as factors in a satisfying life?

What is the place of the economic factor in race improvement and how may this be met?

The embodiment of the principles of eugenics in the warp and woof of life is not the only thing that will enable the Teutonic race to maintain a place in the sun, but neither will all the others combined, without eugenics, be able to achieve that goal. Whatever else may be needed, eugenics cannot be omitted.

12. *The personal aspect.* Education needs to be viewed first from the standpoint of social welfare and then from the standpoint of individual welfare. The state and the home must be provided for, conserved, and developed so that the individual may have a setting in which to live. Between the two there

is no inherent conflict, for participation in the affairs of the state and of the home may be as interesting as playing ball or following a hobby, and without a developed and secure social background the conditions for following a hobby would be quite unfavorable.

13. *Personal enrichment.* The effects of education from the personal aspect may be divided into (1) personal enrichment and (2) improved leisure activities. Even though the completion of a high-school and college education had not improved his economic status one whit, the college graduate still maintains that his time for education has been well spent. He feels that life means vastly more to him with an education than it would have meant without one. His intellectual, esthetic, and social horizons have all been broadened. Intellectually he now has the satisfaction of understanding this world in which he lives. His mind has been liberalized in the sense of having been set free to think on the basis of actualities without interference by superstitions, dogmas, and unreasoned fears; and this blessed state is his even though he has no further opportunity to continue his study in the fields that have given him this insight. The basic insights, adaptations, and appreciations, developed by education, are relatively permanent even though one can no longer recall many of the details from which these products originally emerged. Education is not information so much as it is transformation.

Education should open up to the individual the world of beauty quite as much as the world of understanding. The treasure-houses of literature, music, painting, sculpture, architecture, and the dance should all be unlocked so that the individual may roam among their riches and through this roaming have his heart refined and the beauty and meaning of the world about him opened up.

The friendships and social contacts of the individual are re-

fined and widened through education. His developed tastes attract to him others of similar tastes, while his contacts in college and later in his vocation are likely to be much wider than they would have been without his extended schooling.

14. *Leisure activities.* Great though the influence of education may be in enriching the life of the individual, statically considered, its influence may be still greater in equipping him for the dynamic participation in leisure-time activities. These activities may be considered under two heads: (1) diversions and (2) avocational pursuits. Both are recreative in their effects, yet the term recreation does not adequately characterize them. They yield more than recreation. For the individual they are means to rich and meaningful living, for which purpose they should be directly undertaken, leaving recreation and improved health to come as by-products; and for society they are wholesome and controlling. They keep the individual from interfering with the rights of others by keeping him out of unsocial pursuits. Through their recreative effect and by counteracting influences toward dissipation, they keep the individual fit so that he may be a better worker, a better provider, and a better companion.

15. *Diversions.* Diversions are the activities to which we turn for brief periods of time to appropriate the fun and relaxation that they yield. It may be a stroll through the woods today, the theater tomorrow, the reading of a novel the next day, and participation in a social event on Saturday night. Education in all of its phases should enlarge their range, refine their nature, and make them more meaningful.

The social diversions are deserving of special mention. They not only make life more tolerable, but they also furnish the warmth that welds it together into a unity. From this angle they should be looked upon more as duties than pleasures, yet to enter upon them in the attitude of duty is to rob them of

their wholesome effects. Without interfering with this spirit of delight, but in support of it, young people need to be led to see that keeping up their friends through calls, dinners, and receptions is the means of maintaining a social whole. Without intercourse, both individuals and groups tend to fall apart, develop suspicions, and finally enmities. Travel in one's own country and abroad, the exchange of students and teachers, international gatherings and competitions, and official calls between nations have the same unifying influence in the larger spheres.

16. *Avocations.* Avocations differ from diversions in being more enduring in their appeal. One selects, cultivates, and perseveres in an avocation much as one does in a vocation. Pursuits of music, painting, writing, scientific research, politics, cabinet-making, gardening, stock-breeding, and social welfare activities may all be avocations. In fact, practically anything that may be pursued for vocational purposes may also be pursued for avocational purposes, with much left over for avocational pursuits alone. Thomas Jefferson was a violinist capable of delighting an audience, Joseph Jefferson was a painter of merit, Theodore Roosevelt was a naturalist, and Frank A. Vanderlip, it is reported, makes furniture in a shop in his basement.

An avocation has a place in the life of an individual that is no less fundamental than that of his vocation or his social and political activities. The cultivated person must have resources within himself. His vocation places him under restraint and is not likely to exercise fully his desire for creative achievement, and the diversions, good as they are in their place, do not strike deep enough to yield lasting satisfaction. Unless one has at his command an avocational pursuit, he is likely to find himself by middle life high and dry. He will be without a means of losing himself in a pursuit that is uncon-

strained and soul-refreshing. This requires that an avocation be chosen, developed, and maintained no less than a vocation, perhaps more so. Circumstances compel the pursuit of a vocation, but an avocation may easily go by default. The time for making this choice is in the secondary-school period, and as the students in this period are not likely to think of this aspect of life, it becomes the duty of teachers to direct their attention to it.

For an avocation to be satisfying in the highest degree, it must possess at least three basic characteristics. It must appeal to the pursuer's interest, it must be kept in an amateur status, and it must lead to creative achievement.

In choosing an avocation, interest must take precedence over all else, granted that the pursuit is attainable. The idea that it should supplement and balance one's vocational interest may be ideal, but it is secondary. There are also the diversions to help maintain life's balance. Even when one's greatest interest falls within the range of his vocation, that is still the logical thing to develop as an avocation. Thus a teacher of science may make scientific research his avocation, and a teacher of literature may take up dramatics. This, of course, does not mean that the avocation should fall close to the vocation, but to exclude the possibility would be to sacrifice the primacy of interest.

Amateur status is implied in the term avocation itself, but as there are people who are always looking for the opportunity to turn a penny, no matter where, and who do as yet not appreciate the value of spontaneity, this phase of an avocation needs to be emphasized. A wholesome avocation is much more likely to cost, than to bring in, money. It is worth it. We have here an activity where returns better than money are at stake and where an eye on the financial aspect is likely to prove destructive. Yet, because avocations differ, there are

no hard-and-fast lines. A person who has chosen the short story as his avocational interest may receive a check for a thousand dollars (or less) for one of his creations, but if this does not turn his head and he looks upon it merely as an index of his achievement, it has done him no harm.

Creative achievement is the cream of an avocational pursuit. It is the culmination without which the long hours of preparatory effort, undertaken at the sacrifice of other interesting things, would have brought but a meager return. The joy of achievement is surpassed by no other joy.

When we listed avocational pursuits, we named painting, writing, scientific research, cabinet-making, and so on. This was intentional. Merely studying these things is not a full avocational pursuit. Study is always a necessary aspect, but it is not the heart. This is found in creating something that has esthetic, scientific, or practical value. The pursuit of art must lead to painting, the pursuit of literature to writing, the pursuit of science to publication, and the pursuit of cabinet-making to the production of things that are beautiful to look upon and that are useful.

The opportunities for cultivating avocational pursuits are abundant in our schools. All vital and effective teaching arouses interests that may be seized upon and cultivated, if we but direct the attention of our students to the opportunities. One will find his interest in literature, another in botany, another in history, and another in manual training. Next, we have student clubs and other extra-curriculum activities that present veritable training grounds for avocational pursuits. Music clubs, poetry clubs, camera clubs, etc., may well start activities that will gather momentum as time goes on.

17. *Progress and adventure.* An element that runs through all the departments of a satisfying life is the element of progress. No one can be satisfied long without change. It is all

very well to look forward to the position of one's desires, or to a mate and a home in the suburbs, but once attained there must be something else beyond. The normal course of life presents an abundance of variety and of opportunities for growth, but one must learn to recognize them and to seize them as they pass. Once an opportunity has passed, it usually cannot be again overtaken, but another may be along after a while. Certain opportunities, however, cease coming one's way very soon.

Closely akin to progress is the element of adventure in life. This need not be absent from one's vocation, one's home life, one's avocation, and one's diversions, but there is one institution that should present it with regularity, and that is one's vacation. That is the time for doing something out of the ordinary; for taking that long hike; for calling on distant friends and relatives; for seeing the wonders of nature and of man; for getting acquainted with one's own children.

18. *Concluding remarks.* Personalities differ, and a life that is satisfying for one need not be for another. In broad outlines, however, the factors that we have enumerated are basic for the happiness of the vast majority. The ideal is to participate in a balanced way in all, but that is a condition that few attain. Where one is lacking in the vocation that he would most desire, another is lacking in the home ties of which he had dreamt. One must learn to make the most of what he does have and then he need not fall far short of what might have been. Much as people have been happy with one arm and one eye, or with no arms and no eyes, so they may be happy with one, or with more than one, of the basic connections of life lacking.

The aim of education, then, is to assist young people to become humane, and to prepare them to participate in those affairs that are of abiding concern to mankind.

EXERCISES

1. What measures are being used to decrease the birth-rate in subnormal groups?
2. What factors in addition to eugenics may contribute to the permanence of a race?
3. What difference, if any, is there between educational objectives and educational values?
4. To what extent are venereal diseases a cause of sterility and impaired health? How may this factor be combated?
5. Point out that social laws and regulations are not made by man so much as they are discovered by him, much as the laws of nature are discovered.
6. Point out what differences in teaching are implied by contentful and formal conceptions of education in mathematics; biology; literature; geography; history.
7. Why may we expect the spirit of vocational education to continue to be different from that of general education? Show that this difference is derogatory to neither.
8. "Education is the production and prevention of changes in human beings" (Thorndike, '12, 2). What question in respect to education does this statement leave unanswered?
9. Some people maintain that humanitarian activities as well as political activities should rest in the government. What would this lead to? Think of reasons both for and against.
10. Show that for teachers, with the possible exception of those in the kindergarten and primary grades, subject-matter is always the major. Is this true of supervisors and superintendents? Compare with lawyers and physicians.
11. Thorndike and Gates list the needs (objectives) of education as follows:

    I. Needed adjustments to situations in modern life:
        1. Adjustments to the physical world
        2. Adjustments to economic situations
        3. Adjustments to family situations
        4. Adjustments to social situations
        5. Adjustments to civic situations

II. Needed types of personal equipment:
   1. Physical health
   2. Mental health and balance
   3. Recreational resources
   4. Ethical and religious resources
   5. Intellectual resources

Compare these lists with the objective and subjective lists given in the text.

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CHAPTER III

THE TEACHING OBJECTIVES

1. *The problem.* It is the function of this chapter to reveal and to systematize the objectives of teaching, and it will be the function of the succeeding eleven chapters to develop these objectives and to indicate the basic teaching procedures that each involves.

To avoid becoming confused in his reading, the student should be apprised from the start that there are a number of other expressions used to designate the objectives of teaching. Among these are: the outcomes of teaching, types of teaching, types of learning, types of lessons, types of subject-matter, and the controls of conduct. These expressions are all synonymous, differing only in the point of view from which the writer approaches the topic, and we shall not hesitate to use any one of them when it fits the context best.

2. *Bagley's approach.* A helpful approach to the determination of the objectives of teaching is taken by Bagley ('11, 77) in his *Educational Values*. In this book Bagley introduces the term *conduct control*, and points out that what education is trying fundamentally to do is to raise the conduct of the individual from the plane of untutored instinct to the plane of trained and enlightened purpose.

The child that has learned to read, to write, and to figure has been elevated to a higher plane of action. He has acquired the keys that may unlock for him the treasures of our social inheritance. He has been given tools that enable him to participate in the activities of civilized life. He can now enhance the significance of his own life and make contributions to the

welfare of others that would have been quite beyond his untutored native endowment. The person who understands the facts and relationships of nature as revealed in physics, chemistry, biology, geology, and astronomy sees the world in new perspective. He can no longer react toward natural phenomena as his forbears did in primitive times, or as his untutored neighbor does today. The whole controversy over evolution resolves itself into a question of the possession or non-possession of certain elemental facts in biological and geological science. These facts may be understandingly acquired through a half-year course in zoölogy given in the eighth or ninth grade, yet these facts constitute a conduct control so colossal that their general omission from education for one generation might speedily throw our culture back eight or ten centuries along certain lines.

What is true of the natural sciences is correspondingly true also of the social and the esthetic sciences. Democracy is safe only so long as the native intelligence of the masses is genuinely supplemented by the lessons of history, government, economics, and sociology. We have a native craving for the beautiful, but untutored this craving leads only to the crude decorations and unbecoming conduct characteristic of the savage. Refinement in conduct and environment have come only slowly with the accumulation of esthetic taste and wisdom.

3. *Native and acquired controls.* It is clear that the educational outcomes of the various studies in the curriculum serve in one way or another as guides of conduct, but these are not the only guides that man possesses. In common with all other animals, man is endowed with inborn tendencies and impulses that must also be looked upon as guides of conduct. Suckling, crying, walking, love-making, and prying into the unknown, in man, like the mating and nest-building tendencies in birds, come naturally and do not have to be learned. Con-

sequently we may speak of both native and acquired controls of conduct.

The native and acquired controls of conduct are closely interrelated. The acquired controls are the development of the native controls. Dancing, skating, and riding a bicycle are adaptations of the native powers of locomotion; standards and ideals are, on the emotional side, adaptations of our native feelings; and knowledge is the outcome of our native intelligence. There is, in fact, no act of skill, attitude, an item of knowledge in the educated person that is not rooted in native endowment.

4. *Native controls classified.* The determination of what the native powers and capacities of man are in detail is one of the problems of psychology. These powers are diverse and numerous, but for our present purpose it is not necessary to enumerate them. It is sufficient for us to group them into three comprehensive classes. These are: (1) intelligence, (2) feeling, and (3) action. This is essentially the familiar division of human traits into knowing, feeling, and willing.

By intelligence, in general, is meant the power to profit by experience. It includes the abilities of perceiving, retaining, associating, and recalling experiences. Thinking and reasoning, to one or both of which the term intelligence is sometimes improperly restricted, are but highly developed manifestations of intelligence and really involve all four of the factors mentioned, with emphasis on association. Perception, memory, association, recognition, recall, imagination, thought, and reason are all factors and functions of intelligence.

By feeling is meant the subjective or organic response and attitude toward a situation; the appreciation, in a broad sense, of the value that a situation has for one. A person does not perceive a rose, a sunset, a waterfall, a thunderstorm, a friend or an enemy with cold and colorless intellectuality, but with

a characteristic inner disturbance that seeks some appropriate outward expression. This inner disturbance causes a form of consciousness known as feeling or emotion. Only in reflex action, or in situations where habit has fully supervened, is this aspect of consciousness absent or imperceptible.

That feeling prompts to action and is therefore a conduct control is well known. Anger prompts to defense, fear to flight or concealment, and sympathy to the assistance of the one in distress. The feelings have been aptly called the springs of conduct.

Action, or motor response, is the overt manifestation of life in all animals, except the very lowest. Reflex action and fully established habitual action take place without the coöperation of feeling and intelligence, but all other varieties of action involve one or both of these factors. Instinctive action, such as the nest-building action of birds, is guided by sensation and perception; these are its light; and it is prompted and sustained by a series of feeling impulses. Volitional action also involves perception and feeling or desire, but its distinguishing characteristic is guidance by an idea. The person who wills an act knows in essence what he is about to do; unless he does, his action is below the threshold of volition.

The preceding paragraph should make it clear that intelligence, feeling, and volition are not separate and independent mental entities, but are related aspects of mental functioning. One or the other may be in the ascendancy for the time being, but, with the exceptions of reflex action and habit, all are present to some degree in all normal human responses.

5. *The acquired controls.* It has already been pointed out that the acquired controls of conduct are outgrowths of the native controls. They are really the native controls modified, developed, extended, and recombined by environmental forces, of which formal education is one of the most potent. Intelli-

gence gives rise to knowledge, feeling is a basic ingredient in cultivated standards, ideals, tastes, and attitudes, and the native power of action develops into acts of skill, such as speaking and writing, and motor control in general.

6. *Conscious and automatic functioning.* All three types of acquired controls function between two limits. These limits are full conscious guidance on the one extreme and automatic or habitual response, with a vanishing amount of conscious guidance, on the other. This may be readily observed in handwriting. The child learning to write guides the making of every stroke of every letter with a wave of high conscious intensity, but it isn't long before this wave begins to recede, especially in reference to the simpler and more frequently used strokes. With the educated adult practically all conscious guidance in the forming of letters and words has been lost. All he has to do is to think his thought into words and the hand automatically takes care of the writing.

This same development from conscious to automatic control takes place also in knowledge and in standards and ideals. A physician in the early stages of his practice is likely to diagnose a case before him with a high degree of conscious reference to the facts and principles learned in the medical school, but the process becomes more and more direct and habitual as time goes on. A boy of ten may very consciously try to embody his father's bearing in his own conduct, but by the time he is twenty-five his conduct and bearing are in most respects automatic.

The movement between conscious and automatic control may go backward as well as forward. A control that has become quite automatic will recede when it is not used. A musician must remain in practice in order to play well and even a college professor would not care to repeat his college entrance examinations without special preparation. We

speak of "growing rusty" through lack of practice and in the field of knowledge we speak of this process as forgetting.

7. *Knowledge.* The seemingly endless varieties of knowledge may, from the objective or logical standpoint, all be grouped under two heads: (1) knowledge of particular things and phenomena, and (2) knowledge of relationships between particulars. These relationships when expressed in words are spoken of as generalizations. Knowing the Washington Monument, Boötes, and the Mississippi River are instances of knowing particular things; to witness the eruption of a geyser, a stroke of lightning, or a chemical experiment is to witness a phenomenon. Understanding the principle of refraction, the law of gravitation, the rule for the division of decimals, and the definition of an adverb are examples of generalized knowledge. No image of a particular object or phenomenon is necessarily in mind when thinking of any of these. When it is, it merely exemplifies the meaning.

Generalizations have no independent existence in the world about us and may not be observed by themselves as may a particular flower or a particular geyser. Generalizations are mental abstractions and are noticeable only when particular things are compared in respect to likenesses and differences in form, qualities, origins, modes of action, and the like.

It was noted even before the advent of formal science that such trees as oaks, maples, or birches have common characteristics, on the basis of which they were classed together and given a class name. The same is true for a host of well-known plants and animals. Psychologically this process gives us our class concepts; logically it leads to the formulation of definitions. Other processes of generalization lead to principles, to laws, and to rules. The process of making a generalization from particular data is known as *induction*, and the process of using generalizations in solving problems of various kinds is

known as *deduction*. These two processes, both of which the trained teacher should have well in hand, will be taken up in some detail in Chapters V and VI.

8. *Fixed knowledge.* We speak of knowledge as having been well learned or poorly learned, of having been memorized or not memorized; but generally speaking we do not have separate terms for fixed knowledge and for knowledge that functions with conscious effort. Knowledge that is used often tends to become fixed and to be at our instant command. People seldom forget their names, their house numbers, the alphabet, or the fundamental processes of arithmetic; but this is not true for many people with respect to the law of gravitation, the laws of falling bodies, the characteristics of chlorine, the Hartford Convention, and the achievements of Frederick the Great. With respect to things like these it has been well said that half of an educated person's knowledge consists in knowing where to find things. This implies that, in detail at least, not everything gone over in school needs to be memorized. Yet even knowing where to find things implies that something has been retained.

9. *Standards and ideals.* When we add feeling to an idea, it becomes an ideal or a standard. This indicates the close relationship that exists between knowledge and the topic of this section. Standards and ideals are not entirely new items in the outcomes of teaching, but they are knowledge plus feeling, which gives us our appreciation or sense of value. Feeling does not stand alone in our minds, but represents our attitude toward the things we see, hear, touch, or understand. Feeling of some sort is probably just as much a part of perception and knowing as the percept and the image.

If every situation could or would arouse only one feeling attitude, the matter would be simple and the realm of feeling would present no additional problem in teaching; but the

matter is not so simple. The attitudes that different persons have toward similar situations may vary widely. The attitude toward burglary may vary all the way from intense disapproval, through an attitude of indifference, to active approval, in the sense of regarding it as an interesting, adventurous, and profitable occupation. Perfunctory and even perverse attitudes may in certain social and esthetic situations become established quite as readily as socially desirable ones. This places a specific responsibility upon the school. This institution, together with the home and the church, must lead young people to feel aright — to give approval where approval is due and to hate injustice. The technique of doing this will occupy us in Chapters IX to XI.

How, if at all, may standards and ideals be distinguished? Much confusion exists in respect to this question and the student is not likely to get much help from educational literature. Yet a helpful logical distinction may easily be made. Standards correspond to particular knowledge and ideals to generalized knowledge, as discussed in the preceding section. A standard is particular or concrete while an ideal is general or abstract. A boy in the elementary school may at one period take as his standard of conduct the uprightness and dignity of Washington, at another the simplicity and democracy of Jefferson, and at still another the humanity and kindliness of Lincoln. At each period he may consciously aim to embody in his own conduct the appealing qualities of his hero. But as time goes on these specific goals lose their concreteness and develop a more generalized character. The elements of dignity, simplicity, and sympathy become separated from their moorings and stand out as goals, or as elements of a goal, in their own right. They become integrated into ideals or principles of conduct. We speak of a man who has reached this point of development as a man of principle. His conduct

is, in the main, no longer mediated by images in the concrete as carriers of the associations of value, but it functions directly on the basis of generalized symbols of value. His standards have become generalized into ideals and attitudes.

10. *Tastes and attitudes.* Just as knowledge, either in the particular or generalized form, becomes automatic in its functioning when frequently used, so standards and ideals crystallize into automatic responses. This is true in respect to both their intellectual and emotional aspects. Either may be reinstated, the intellectual when one is called upon to justify his course, and the emotional when there is an actual or threatened violation of the standard or principle. As a guide in conduct, the emotional aspect of a well-established goal may be likened to the embankment of a stream. So long as the stream moves smoothly on, the banks are unnoticed, but when something blocks the stream, they become conspicuously evident. So it is with conduct. The person whose conduct is by instinct and habit thoroughly ingrained on a moral plane goes about his business as smoothly as the undisturbed stream. But let someone suggest to him that he cheat or steal! Instantly the emotional element characteristic of his full-fledged attitude toward these transgressions is reinstated. Righteous indignation in addition is likely to be added. His emotion acts as an embankment to keep his conduct true to its course.

There appear to be no standard terms that are used to designate emotionalized values that have become automatic in their operation. The term *attitude* is used frequently in the social field and the term *taste* is usually used in the esthetic. We speak of a person's taste in attire, in household decorations, in literature, in art and in music. Similarly we speak of a person's attitude toward cheating, toward lying, toward political corruption, and so on. But attitude is not the only

term used here. We have already used the expression *man of principle* in speaking of a person whose ideal of conduct has become fixed on a high plane.

In the social field shades of meaning are expressed also by the terms *prejudice* and *bias*. Following the root meanings of these terms, the prejudiced person ought to be one who *pre-judges* situations — i.e., judges them without ascertaining the facts; and the biased person one who is not quite straight or balanced in his attitudes. To the extent that this distinction is observed, we may say that a bias is primarily inborn; it rests on an inherent deviation from the normal. A person who is spoken of as having been "cut on the bias" has been so cut by nature. Prejudice, on the other hand, is usually used to indicate an unrationalized attitude acquired through early social influences. Thus a person may become prejudiced against evolution, as applied to man, by early theological indoctrination.

Because standards and ideals involve intellectual as well as emotional elements, the guides of conduct arising from them may be either cultivated or uncultivated. As no native tendency can remain long unmodified by environmental influences, we usually mean by an uncultivated taste a taste as given to us by nature and as modified by the relatively unconscious or unreflective operation of the forces in the environment. A cultivated taste, on the other hand, involves instruction, or at least reflective observation. The person with cultivated taste not only knows what he likes or dislikes, but why he likes it or dislikes it.

Attitudes, from the standpoint of cultivation, are either rationalized or unrationalized. A rationalized attitude is one that has been subjected to the illuminating influence of knowledge, either during or after the process of acquisition; an unrationalized attitude is one that has not been so influenced.

The attitudes that one acquires seem to be influenced to a considerable degree by one's native endowment. Even in the same or in similar environmental situations, different persons will acquire dissimilar attitudes. It appears to be easy for one to become a liberal, another a conservative; one an individualist, another a socialist; one a democrat, another an aristocrat. In metaphysical outlook it has been said that people are born either Platonists or Aristotelians. Each person has his native bias.

One of the most potent influences in moulding attitudes is social suggestion. We imbibe the spirit of our homes, of our communities and of our times. Particular attitudes in politics and in religion are noted for running in families, in sections, and in nations, sometimes quite regardless of the presence of other than social factors.

Dogmatic instruction is the great agency in the production of unrationalized attitudes. It operates especially in the field of religion and, in early childhood, in the field of conduct. Whether or not dogmatic instruction in matters of religion is desirable or necessary depends entirely on one's point of view. The fundamentalist would emphatically say "yes," while the modernist would quite as emphatically say "no." In the moral and social training of children, however, a certain amount of dogmatic instruction seems quite unavoidable. To the extent that children can appreciate it, rationalization should always be given, of course, but little children cannot to any great extent appreciate the reasons for what they should or should not do, yet it is relatively easy to give them attitudes of the unrationalized type. These will serve them effectively as guides in critical situations. As their capacities and knowledge develop, these attitudes will become more and more fully rationalized with a benefit rather than a detriment to the final result.

A distinguished man of my acquaintance was brought up in a home of sincere and strict sentiments against dancing, card-playing, and the use of alcoholic liquor. He imbibed these sentiments and accepted them whole-heartedly. Upon the least provocation he would fight for them. To discuss them without becoming aroused to the striking point was next to impossible. In school he became especially interested in the social sciences. He went in heavily for these sciences both in high school and college, and ended up with the degree of Doctor of Philosophy in economics. Later, as a government expert in economics he traveled extensively in various sections of this country, especially in the South. All this had the effect of rationalizing his social attitudes very fully. The result was that he continued to adhere in essence to the sentiments imbibed in childhood, but he now could give reasons for them and discuss them deliberately. He now had an additional outlet for his energies and he became reasonable and tolerant. This instance well exemplifies the difference between unrationalized and rationalized attitudes and it indicates the mode of development of one into the other.

11. *Motor control.* The native power of motor response develops into consciously guided motor control, such as acts of skill, vocal expression, and a variety of physical habits. Among these may be mentioned walking, dancing, talking, singing, writing, typewriting, shorthand, drawing, golfing, tennis, gymnastics, and laboratory manipulation. A few of these do not concern the school, but most of them do.

We have already exemplified the movement from conscious guidance to automatic control in this field by reference to handwriting. The same point is even more clearly obvious in learning to run an automobile. At first one has to think of just what switches to set, what levers to move, how to shift gears, and how to steer, but with practice all these processes

become automatic and one is left free to watch the road and the traffic. The principles and technique involved in developing acts of skill and related responses will occupy us in Chapters XII and XIII.

12. *Objective and subjective standpoints.* It should be noted that the discussion in this chapter views the conduct controls primarily from the objective or logical standpoint. We have viewed knowledge, for example, as referring to things, phenomena, and relationships in the world about us. But we might have investigated the various types of control also from the subjective or psychological standpoint. In addition to asking, what are the primary varieties of things known, we might also have asked, by what is knowledge represented in the mind? What are the subjective counterparts of our knowledge of things, phenomena, and relationships? This would have led us into the discussion of such things as images, concepts, meanings, and ideas. Similarly we might have delved into the psychological nature of tastes, standards, ideals, and volitional action.

The study of these and similar questions is of great importance to the teacher. To be professionally educated the teacher must study these questions. Their study, however, belongs to psychology and not to the principles of teaching. In fact, the principles of teaching should assume a knowledge of psychology. Furthermore, teaching is concerned with the outcomes of teaching objectively considered primarily, and with psychological processes secondarily. The immediate goals of the teacher's work are knowledge, ideals, attitudes, and motor control in pupils, and in the achievement of these goals the teacher may sometimes be assisted by a knowledge of the mental facts and processes of the pupil. Psychology is here related as a means to an end. As we proceed in the following chapters with the theory and technique of acquiring the outcomes of

teaching, we shall have frequent occasion to make use of psychological principles, just as we shall have frequent occasion to make use of logical principles, without, however, trespassing on the field of either of these subjects.

13. *Summary.* The conduct controls that we have discussed in this chapter may be summarized by the following outline:

Native Controls	Acquired Controls	
	Functioning consciously	*Functioning automatically*
Intelligence	Knowledge	
	a. Particulars	The same items, functioning automatically
	b. Relationships	
Feeling	Appreciation	
	a. Esthetic — tastes	Established tastes, attitudes, biases, prejudices
	b. Social — standards, ideals	
Action	Motor control	Physical habits and acts of skill

In this outline, only the acquired controls represent the objectives of teaching.

EXERCISES

1. How may things and phenomena be distinguished?
2. Compare Bagley's outline of the controls of conduct ('11, 15) with the summary of this chapter.
3. To what extent does it appear to be true that people are born Platonists or Aristotelians? What is meant by this expression?
4. What, from your experience and observation, are some of the consequences of the inculcation of unrationalized attitudes in childhood?
5. Compare Parker's types of learning ('20, 95) with the outcomes of teaching developed in this chapter. Do the same for two other recent texts.
6. It is frequently said that ideals cannot be realized in practice.

In what sense may this be true? Show, by using instances, that it need not be true.

7. Are standards always generalized into ideals or is there a tendency for some people to remain on the plane of the concrete in guiding their conduct? What evidence have you for your conclusion?
8. Give two instances in which particular items of knowledge serve as guides to action. Do the same for generalizations. May knowledge be valuable (to the individual) without guiding overt action? If so, give examples.
9. Give specific attitudes from your experience in which rationalization has followed, by many years perhaps, the acquisition of the attitude. Give other instances in which the two came simultaneously. Do these two classes differ in any particular respects?

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CHAPTER IV

MASTERING RELATIONSHIPS (INDUCTION)

1. *Point of departure.* It was brought out in the preceding chapter that all of our experiences with the world, from the standpoint of insight or understanding, may be grouped under two large heads: (1) knowledge of particular things and phenomena, and (2) knowledge of relationships. If we were to proceed logically, we should next take up the teaching of particular topics, but there are two reasons why we shall turn first to the teaching of relationships. Relationships are needed for the understanding of particular topics, and the procedures for mastering them were developed first historically. In discussing the teaching of particular units, we shall be obliged to use the ideas brought out in this chapter and the next, and there is also a psychological advantage in following the path of historical unfoldment.

2. *The problem.* Relationships are expressed in language as generalizations. When we say that all unsupported bodies fall, that sunshine is good for plants, that a noun is a word used as a name, and that in dividing one fraction by another we invert the divisor and proceed as in multiplication, we are stating relationships in the form of generalizations. *The problem of this chapter is to make explicit the procedure that the mind naturally uses in arriving at a generalization.*

Relatively few generalizations are in life made consciously and explicitly. We are receiving them continually from others, from our reading, and from our own experience, and we are using them constantly. All recognized uniform sequences in our experience are incipient generalizations. The infant

who has learned to cry for food, for company, or for entertainment, and does so with intent, has in a practical way already generalized. When one learns to distinguish cats, dogs, horses, and cows; when one learns that fire burns, that mosquitoes bite, and that keys unlock doors; when one learns that a chair may be used to climb on the table, or a stick to poke something off the bookcase, one is acquiring generalizations. In fact, it is as natural for one to perceive and use relationships as it is to know and use objects, if indeed the knowledge and use of objects does not always imply the knowledge and use of relationships. Generalization rests upon the psychological principle of association which operates quite as spontaneously as sensation. It is no more necessary to teach one to generalize than it is to teach one to see or hear; yet, just as one may learn to observe with care, so one may learn to generalize with care.

The simple generalizations referred to in the preceding paragraphs are picked up readily by normal children without special instruction, but not all generalizations are of this simple nature. Such generalizations as the principle of gravitation, the laws of falling bodies, and the laws of electrical manifestation in physics; the principles of organic evolution and of hereditary transmission in biology; and Weber's law in psychology were worked out with much pains only by men of genius. Our sciences, both natural and humanistic, abound with generalizations in the form of principles, laws, rules, and definitions, and in many instances it is necessary for the teacher to develop them with much care in the minds of the pupils if they are to be adequately understood.

3. *Historical background.* Scientists have been persistently and productively at work revealing for us the uniformities of nature ever since the fourteenth century. These scientists, very properly, have been interested in results and have never been much concerned with the philosophy of their method.

Yet the method that yields results for the scientist ought also to yield results in all other aspects of life where inductive procedures apply. This should make it worth while for some one to lift out, analyze, and systematize the procedures of the scientist. Francis Bacon attempted this, but he did not succeed fully, mainly because he did not recognize the function of the hypothesis. John Stuart Mill and others have supplemented the work of Bacon, and it may be said that from the logical standpoint the inductive procedure has been fairly well formulated for about a century. For some reason logical theory has never carried over very well to educational theory, perhaps because men who have specialized in both educational theory and logical theory have been few.

The educational bearing of Bacon's work was taken up by a group of educational reformers known as sense realists, and by them it was passed on through Rousseau to Pestalozzi and Herbart. The sense realists saw that the acquisition of knowledge by the child had much in common with the discovery of new truths by the scientist and they made notable progress in using induction procedures in teaching. It remained for Herbart (1776–1841), however, to break through and distinguish the logical aspects of inductive teaching. He did this rather abstrusely, and he failed to bring into relief the problem, which starts the process, and the hypothesis, which carries it on. His formulations, nevertheless, proved fruitful in stimulating others, and they had led by the last quarter of the nineteenth century to the formulation of the Herbartian five formal steps of instruction. These steps, or aspects as they should more properly be called, are still current in textbooks on teaching, although in recent years a tendency to disparage, and even to discard, them has become evident. For this there are several reasons. First, teaching, like all other social processes, has its cycles of fashion. The

so-called progressive methods of today are all free and unsystematic and appear not to fit in very well with the Herbartian procedure. Back of this fashion there is, of course, more than mere whim. To the extent that logical outlines stiffen and formalize educational procedures they are harmful.

Another reason why the Herbartian steps are being looked upon askance is because they still harbor disturbing imperfections. Teachers who have tried sincerely to follow them in their teaching have everywhere complained that these steps lead to stilted, formal, and time-consuming instruction. Let us note, therefore, what these steps are, how they may be improved, and what the aspects of inductive procedure really are.

4. *The Herbartian "steps."* The Herbartian five formal steps or aspects of instruction are usually given as follows:

(1) Preparation and aim
(2) Presentation
(3) Comparison and abstraction
(4) Generalization
(5) Application

The function of the step of preparation is stated as being the preparation of the pupils' minds for the reception of the new truths through the revival of related ideas already known. The step aims to take advantage of the principle of apperception. The function of the aim is to center the pupils' minds on the topic in hand and to arouse interest. The function of the second step is to present the new material of the lesson. In the third step this material is analyzed and compared and the general truth sought is, theoretically at least, abstracted. In the step of generalization this truth is formulated and clearly stated. Finally, in the fifth step the new generalization is applied or used.

In spite of its imperfections and faulty application, it cannot

be denied that this formulation of teaching procedure has had a far-reaching and beneficial influence on classroom practice. It has shifted the attention from the memoriter acquisition of general truths to the development of these truths in the active thought of the pupil. The solution of some present difficulties in this formulation lies not in discarding it, but in improving it, in applying it intelligently, in using it only where it applies, and in supplementing it by other procedures where it does not apply. It is not a panacea that fits the development of every type of teaching objective.

5. *The "steps" revised.* The Herbartian outline represents the aspects found in a complete act of thought when analyzed. Their improvement must be brought about by a more adequate analysis of thought as this goes on in the actual process of learning. In addressing ourselves to this problem, let us imagine ourselves observing a class that is engaged, under the guidance of a skillful teacher, in thinking out the cause of the condensation of moisture from the air. The assumption is that the pupils do not yet know that the air gives up its moisture when it is sufficiently cooled.

A. Problem and setting. The first thing to be noted is that a lesson like this is usually not taught by itself, but falls in a series of related lessons. One lesson topic leads naturally and logically to another. The class before us, let us assume, has just completed the study of evaporation. The pupils have learned through experimentation, observation, and the recall of common experiences that the air takes up moisture and that it takes it up at different rates and in different amounts under different conditions. The teacher's next step forward is to lead the pupils into a meaningful realization of the problem ahead. To do this the topic of evaporation must be briefly reviewed by questions something like the following: What is the topic that we have been studying for the last few days?

(Evaporation.) What do you mean by evaporation? (Process briefly explained.) Does the air ever give up the moisture that it takes up? (Yes, as rain, snow, etc.) Is it always giving up moisture? (Obviously not.) Now what makes the air give up its moisture at certain times? Assuming that the answer to this question is not known, we now have before the class the *problem* of the next topic. Care must be taken that this problem is clearly grasped. It may be helpful to write it on the blackboard.

It should be clearly realized that the beginning or point of departure in an inductive lesson topic is a *problem*, and not some general reinstatement of apperceptive masses commonly called *preparation*. Something of this nature must usually be done also, as is exemplified above, but it is done solely for the purpose of giving the problem a *setting*. The functions of the first step, therefore, may be stated as being *to lift out the problem and to give it a setting so that its significance will be appreciated by the class*.

Where should the problem be stated, at the beginning, the middle, or the end of the first step?

When the lesson topic falls in the midst of a series of topics, as is true in the case before us, there is only one place where the problem can logically fall, and that is at the end of the setting or preparation. To place it earlier would introduce it before the class is ready for it. When the lesson begins a series, or is an isolated one, the situation is different. Then the problem or topic must be stated at or near the beginning of the setting. Unless this is done, the minds of the pupils have nothing to hold on to and are at sea. But after the problem has been stated it may then be given an appropriate setting so that its significance may be appreciated. The teacher here in principle faces the same situation as is faced by the public speaker and by the writer. Note how the effective

speaker or writer brings his problem into relief right at the start. It is his challenge for attention.

The importance of having a clearly realized problem or topic before the class cannot be too strongly emphasized. I have personally known several teachers who failed in their teaching more because they neglected to be explicit in what they were aiming to teach than on any other account. One, a college teacher of history, taught by the lecture method, but it never occurred to him to take the students into his confidence in respect to what he was talking about. As a result at least eight tenths of the lectures were a total loss. The lectures were not sufficiently lucid to reveal their own topic. Such teaching is pointless, vague, and uninteresting, a condition that could easily be avoided.

B. Data. Let us now return to the problem of why the air gives up moisture at certain times. Once this problem is before the class and its significance is appreciated, the pupils will attack it. The wise teacher will permit them to do this in any way they choose, being careful merely that all their suggestions are thoroughly tested and that they do not wander too far afield. Spontaneity is not only possible, but is essential, in the vital development of a generalization. A recognition of the aspects of inductive procedure, especially as we are reconstructing them, must not and need not stand in the way of free and interesting pupil participation. These aspects are not for the pupil at all; they are for the teacher, and even in his mind they should function from the background, not from the foreground, of consciousness. The question that indicates the meaning of these aspects is, What must the teacher know in order to guide with assurance the pupils' activities in formulating a generalization?

The teacher must realize that the solution of all thought problems, including the inductive, requires the use of data.

Thinking does not and cannot go on in a vacuum; it requires grist upon which to work. Many a teacher has called pupils numbskulls when he himself was the numbskull in not directing the pupils into the path of the data needed in solving the problem before them.

The data needed in solving an inductive problem are of two kinds: (*a*) instances of the objects or phenomena for which a generalization is being sought, and (*b*) hypotheses.

The first suggestion that a pupil would make in solving the problem of why the air gives up its moisture at certain times would very likely be a hypothesis of some kind. He might say that the air gives up its moisture when it gets dark. When challenged, he might say in defense of this proposition that it always gets dark when it rains, when it snows, and when clouds are formed, and that dew and frost gather in the night. The order of this procedure is typical. In developmental teaching, and in typical inductive research work in science as well, the hypothesis is suggested by a few particular facts, perhaps by only one, and this hypothesis then stimulates the gathering of an array of particular facts in order that it may be proved, disproved, or modified.

The facts presented do seem to agree that darkness and the condensation of moisture are related, yet some of the other members of the class and the teacher would not be satisfied. Instances apparently not harmonious with the theory presented would be suggested and together they might collect a list somewhat like the following:

1. "Sweating" of ice-water pitcher
2. Moisture on kitchen windows
3. Clouding of eye-glasses
4. Breath on window-pane
5. Breath on cold day
6. Steaming of tea-kettle

These instances of condensation obviously take place irrespective of light conditions; they occur in bright daylight as well as at night. The darkness hypothesis must therefore be discarded and another must be sought.

An examination of the array of instances of condensation just given might have suggested to some member of the class that the air gives up its moisture when it strikes something smooth. Very good. This hypothesis does seem to agree with the first four instances. In each one glass is present. But how about the fifth and sixth? And how about rain, snow, and the others mentioned before? Clearly there is no agreement, a smooth surface is present in none, and the hypothesis must be discarded. An acceptable hypothesis must agree with *all* the instances.

By this time, let us assume, it has occurred to someone that cooling may be the essential factor in condensation. Perhaps the air gives up its moisture when it is sufficiently cooled. Good again. An analysis of the instances presented appears to reveal the fact that cooling has been present in every one of them. This is obvious in each of the second group of instances, and, while it is not so obvious in the others, there is nothing to contradict the assumption, and it may be assumed to be present in them also. Pending further and more conclusive verification, we may assume, for the present, that our problem has been solved. The data used in solving it consisted of (*a*) particular instances of condensation and (*b*) hypotheses or tentative solutions.

C. Testing hypotheses. The third aspect of induction of which the teacher should be aware is the testing of the hypotheses that have been suggested as solutions. This aspect is in practice really not separate from the presentation of the data, as is evident from the discussion in the preceding section. Each hypothesis was tested immediately after it had been sug-

gested and in this testing additional items may have been added to the list of data. This reveals a very important characteristic of the inductive process as used in life and as it should be used in teaching. The different "steps" of the process are not completed one after the other, but they are only logically distinguishable aspects of one unified process. There is a weaving back and forth through it all until a satisfactory solution is finally adopted. The formulation of the problem may seem to be an exception to this, but even here data are appearing that are used again later on.

It is in this third aspect of induction that the traditional formulation contained its greatest defect. The wording of the third "step" in the traditional formulation was *comparison and abstraction.* The word *hypothesis* did not appear. The assumption was that the particular data had to be analyzed and compared and that the generalization had to be abstracted from them. This is actually the way in which teachers have been trying to proceed. Naturally they failed. There was no guide or tangible motive in the analysis and comparison. The process was at best a blind groping which usually ended in the teacher telling the solution.

It would be more true to say that the generalization is read *into* the data than that it is read *out of* them. Careful analysis and comparison are undertaken for the purpose of seeing if the hypothesis fits the facts. Without the hypothesis these processes have no point. Anyone at all familiar with the historical development of inductive science, social as well as natural, knows that the hypothesis has been the life of the process. The hypothesis, it is true, is suggested by facts, but it is at first only a suggestion and may be far from the truth. Its merit lies in giving a start to the process of systematization, and no matter how absurd it may appear, it should be given a respectful hearing. This hearing may lead only to its

abandonment, but the chances are good that the examination of the data that it induces will lead to the suggestion of another hypothesis. This in turn may be rejected; and it may be that this process of receiving, testing, and abandoning of hypotheses may go on for some time. In scientific research it may go on for years. But without an hypothesis the thought process is blocked from the start. This is well exemplified by Galileo's problem of the suction pump. This pump had been used since prehistoric times and Galileo was not the first to be puzzled by it. Why should a pump draw water about thirty-two feet and no farther? The problem was clear enough and Galileo was well aware of it. But what is the cause or principle of its operation? What is suction? How does it work?

Unless a workable hypothesis occurred to one, he could go on till doomsday restating the problem, and that is just what Galileo did. He was stuck, and he died without solving the problem.

But the fruitful hypothesis did occur fairly soon to one of Galileo's pupils, Torricelli by name. It occurred to Torricelli that perhaps the air had weight and that the weight of the air caused the water to rise to a point where the weight of the two would balance. This is a suggestion that may be tested and Torricelli lost no time in doing so. He reasoned that if the air is doing it and the air can hold up a column of water thirty-two feet in a vacuum, it ought to hold up a column of mercury about thirty inches. Accordingly he took a thirty-six-inch glass tube, filled it with mercury, and inverted it into a cup of mercury. Eureka! The mercury in the tube settled down to thirty inches! Not only had the principle back of the pump been discovered, but the barometer had also been invented. Of course there was further verification, especially by taking this new-found barometer up a mountain-side, but this was not done immediately.

The matter of giving a respectful hearing to all hypotheses that have been sincerely suggested is a matter that is often disregarded in the schoolroom. Knowing the answer beforehand, many of the suggestions made by the pupils no doubt sound absurd to the teacher, but this is no ground for losing patience. To ridicule a suggestion seriously made by a pupil is unpardonable.

It is one thing to make suggestions *before*, and quite another thing to make them *after*, the solution is known. Even great scientists have tried what seem to us now foolish things. It is recorded that Kepler tried and discarded twenty-one different hypotheses before hitting upon the correct idea of the movement of the planets in their orbits, and that Ehrlich, the great German scientist, tried out 605 experiments before hitting on the right one in making one of his discoveries. Darwin, we are told, never allowed a suggestion to go untested, no matter how small was his expectation of receiving an affirmative result. He called it making "fools' experiments."

In learning, as in scientific research, it is better to think wrongly than not to think at all. The wrong suggestion is at least a start and the teacher should be grateful for it. It gives him the opportunity to lead the pupil to test and reject his own hypothesis. There is no better way for the pupil to learn how to check up on his own suggestions.

D. The generalization. The generalization in induction is nothing more than the wording of the hypothesis that has been accepted as satisfactory. In this process of wording, the pupils should be given an opportunity to take part. Two or more may be asked to step to the board and write out their conception of it, and then all, the teacher included, should take part in improving the wording. New technical words and phrases should be supplied by the teacher. These are an aid in the economy of thought and expression and there should

be no hesitation in teaching them whenever needed. Pupils readily appreciate their advantage and take delight in mastering and using them.

There is a helpful relationship between the problem and the generalization or conclusion. The conclusion is the answer to the question raised as the problem. This constitutes a simple and convenient test of the correctness of the process. If the conclusion is not a clear-cut answer to the question raised, the process must have gone astray somewhere *en route*. Obvious though this seems, the point is nevertheless overlooked sometimes. Some years ago a printed booklet containing about eighty lesson outlines was handed to me by a supervisor. This supervisor explained that the teachers in her city had had difficulty in applying the five formal steps and that this book was prepared to help them. I looked it through with much interest and found that in fully half of the outlines the conclusion bore no clear-cut relation to the stated aim or problem. Similar errors are plentiful in educational literature, even in books on the theory of teaching, and we shall recur to them in Chapter VI. They usually result from an attempt to apply the Herbartian formulation to topics that are particular rather than inductive or deductive in nature and so do not contain the fivefold aspect.

E. Application and verification. By application is meant the use of the generalization that has been developed. In the light of the principle of condensation of moisture from the air, explain the formation of dew. This problem, and others of a similar nature, will cause difficulty for many members of the class even though the principle seems to have been clearly understood.

After the definition of an adverb has been developed, it must be applied by identifying adverbs in sentences; after the rule for dividing fractions or extracting square root has been

developed, it must be applied to problems coming under the rule. So it is with every generalization that is taught. Unless it is applied to a variety of problems, it is not likely to be mastered.

There has been a tendency in recent pedagogical literature to omit the step of application from the inductive outline and relegate it to deduction on the ground that the step is deductive and not inductive.[1] This is logically correct, but from a pedagogical angle it is wrong. The step is needed in teaching for the *clarification* and *impression* of the generalization that has been developed. The function of the deductive teaching exercise, on the other hand, is the acquisition or extension of knowledge — an entirely different matter.

From the standpoint of logic there is another aspect that should be included under induction, and that is *verification*. It may seem that this aspect has been adequately included under testing the hypothesis, and from the pedagogical standpoint this may be sufficient. Yet in the field of science it is true that a generalization is subjected to verification for a long time after it has begun to be accepted by some. The principle of evolution is still being verified in various ways and a similar thing is true in respect to the law of gravitation in the light of the Einstein theory.

In testing the hypothesis that cooling is the essential factor in the condensation of moisture from the air, we made use only of what is in logic known as the *method of agreement*. We were careful to see that our hypothesis agreed with *all* of the instances before us. But this is never accepted as conclusive proof in logic. Had we, for example, had before us only the four instances of the condensation of moisture on glass, then the second hypothesis that we considered, namely, that moisture is condensed from the air when it strikes something smooth,

[1] See, for example, Charters ('12, 326) and Earhart ('15, 41).

would have had to be accepted. It would have agreed with every one of the instances before us. Yet the conclusion would have been wrong, for, whether we knew it or not, instances would have been in existence with which the hypothesis would not have been in agreement. What is still needed is the application of the method of difference. Before accepting smoothness as the cause of condensation, we must make sure that moisture will not condense on a rough surface, such as rough glass, crude iron, or rocks. Experimentation will readily show that moisture will condense on these objects. Therefore smoothness has nothing to do with the cause.

By applying in a similar manner the method of difference to the assumption that cooling is the cause of condensation, we can readily prove that this assumption is correct. Take two instances, or groups of instances, that are alike in every respect except one — temperature. Let us note the difference in having ice water in one pitcher and warm water in another, in breathing on a cold pane of glass and also on a warm pane, and so on. Moisture will condense in one group of instances and not in the other. The one and only respect in which these instances differ must be the cause of the condensation or the lack of it.

In the classroom the application of the method of difference, together with the wide use of the generalization concerned in solving problems, may be taken to stand for verification. That pupils should become familiar with this term is important. Verification is a scientific and social ideal that is of much consequence in life. The pupil who has gained an insight into the real meaning of verification has been initiated into the scientific spirit. This spirit implies a knowledge of the difference between an attractive and wished-for assumption and a verified conclusion; it implies a desire to verify every consequential statement that one uses, a determination to command

the evidence before making an assertion of weight. To develop this spirit is well worth while and the teacher may properly seize every opportunity to verify statements of fact and assumptions of relationship and to bring out the significance of the scientific spirit in all the aspects of life.

6. *Outline of induction.* The aspects of the inductive procedure as we have developed them may be summarized as follows:

1. Problem and setting.
2. Data { *a*. Particular instances; *b*. Hypothesis
3. Testing the hypothesis
   (by analysis and comparison of data)
4. Generalization or conclusion
5. Application and verification

7. *Meaning of the outline.* A comparison of this outline with the Herbartian outline on page 55 reveals some significant differences. This is true especially in items 1, 2, and 3. The basic position of the problem in the first item, the functional significance of the setting, the inclusion of the hypothesis as an indispensable datum, and the subordination of analysis and comparison to the testing of the hypothesis, should go a long way in helping teachers to attack inductive problems in a vital and dynamic manner. But the mere formulation of these distinguishable phases of inductive procedure may again mislead teachers to think that they have here something that should be serially followed. Steps, they may think, exist for the purpose of being stepped upon, and it may even seem like bad form to go up two at a time.

To follow this outline, or any other logical outline, is to misuse it. In the schoolroom this is bound to lead to stilted, formal, and time-consuming instruction. The outline is not to be followed, either by the teacher or by the class. Its

function has been served when it has led the teacher to recognize the essential aspects of one unified process and when it has assisted the teacher in guiding the pupils dynamically through this process. The path that the pupils take may be, and usually is, highly circuitous. The pupils' attention should be solely on data and results. Their procedure should be "psychological," and not "logical" in the sense of formal.

Not only should the intelligent use of these aspects of induction lead to more dynamic and effective instruction; it should also lead to economy of time. Knowing just what the essential aspects are, the teacher is in position to guide straight for the essentials and to detect and curtail digressions. After teaching evaporation, to lead the class square up against the problem of the cause of condensation should take but a few minutes. As soon as the problem is recognized, the members of a live class will all want to speak at once in offering solutions. The first solution offered may be the correct one. That is just the hypothesis the teacher wanted, and the quicker it comes, the better. Now let's test it and test it thoroughly. This will necessitate the gathering of an array of instances. All will join in this, including the teacher. Now let us word our principle and let us apply it. In the case of a principle or cause, a few applications at the time are sufficient. More time is needed for applying definitions, such as we have in grammar, and still more for applying rules, such as we have in arithmetic and algebra. In these subjects the bulk of the time in the course must be given to application. But if there is no unusual delay in hitting on the right hypothesis, the entire lesson on condensation may be completed in one period of twenty-five or thirty minutes. And if the pupils have properly participated, they will understand it.

8. *Types of generalizations.* What types or classes of generalizations are there that the teacher may develop inductively?

Omitting maxims and proverbs, which are not full-fledged generalizations, there appear to be only four basal types. These are principles or causes, laws, rules (including formulæ), and definitions.

The terms *principles* and *laws* are often used interchangeably, especially by writers on social, psychological, and educational topics, but in the physical sciences, where a high degree of development has forced logical distinctions, this is no longer the case. The term *principle* is used to designate the operation of a specific causal factor, such as gravitation, inertia, friction, atmospheric pressure, centrifugal force, and chemical affinity. Just what this causal factor is, in ultimate essence, need not be known. The term *law*, on the other hand, is used to designate or describe the uniformity of the action that results from the operation of a cause or principle. Thus, the law of gravitation states that the principle of gravitation exerts a pull that varies directly as the product of the masses and inversely as the square of the distance between the centers of mass. Similarly the operation of every other principle or combination of principles gives rise to uniformities of action that are called laws of nature. The ideal is to state these laws mathematically, as in the law of gravitation and the laws of falling bodies, but this ideal has not yet been universally attained and may never be. In psychology Weber's law is within certain limits stated mathematically, but the laws of association and of forgetting are stated qualitatively. These laws merely imply a high degree of correlation. If we could calculate accurately all the factors involved in impression and recall, these laws could no doubt be stated mathematically.

Principles and laws have reference to uniformities found in nature, including human nature, which gives rise to the humanistic sciences. A rule has reference to a mode of procedure used by man in solving a problem or meeting a situation.

Thus we have a rule for dividing fractions, for multiplying decimals, for making angel cake, for testing the purity of water, and for diagnosing diphtheria. In each case the rule formulates a method of procedure in accomplishing a practical result. In the field of cookery, rules are generally called recipes. When we trace a rule back to find its explanation, we discover that it always rests upon laws and principles. Recipes in cooking are explained by the uniformities of chemistry, physics, and biology, and the rules of mathematics by the inherent relationships of quantities.

A formula is a rule expressed symbolically. Thus the rule for finding the rate when the base and percentage are given is condensed into the formula

$$R = \frac{P}{B}$$

and the rule for finding the density of a substance into

$$D = \frac{M}{V}$$

Formulæ abound in mathematics, physics, and chemistry, but they are found occasionally also in other subjects.

Definition is needed in science, in debate, and in all other situations where accuracy in the use of terms is fundamental. No headway can be made in these situations unless terms are used precisely and consistently, and this precision can be brought about only by defining the terms that are used. The terms that need defining always apply to groups or classes of objects or phenomena, such as tree, house, lightning, or thunder; never to individuals. Such a class of things has been defined when it has been described sufficiently to identify it and to distinguish it from every other class. The essential features are identification and distinction. We must make clear

what we are talking about and we must exclude everything else. This is accomplished by designating the next higher class to which the sub-class that is being defined belongs (identification), and by naming the outstanding characteristics that are common to all members of the sub-class, but to no others (distinction). Thus we may define adverbs as words that are used to modify verbs, adjectives, and other adverbs, and chairs as articles of furniture that have four legs, a back, and a seat intended for one person. In logic the group that is being defined is spoken of as a *species*, the class to which it belongs as the *genus*, and the distinguishing characteristics as the *differences*. The species *adverb* is defined by including it in the genus *word* and by pointing out its functional *differences*. Differences may be functional, descriptive, or genetic.

These four types — principles, laws, rules (including formulæ), and definitions — appear to exhaust the list of full-fledged generalizations. The generalizations falling into these classes were obtained originally by induction and they may be so developed in school, yet the teacher will sometimes find it more economical and perhaps no less effective to teach them by exposition. This procedure is explained in Chapter VI. Where there is no generalization to be developed, the inductive procedure, of course, does not apply.

9. *Sources of generalizations.* Explicit inductive procedure is one means by which we acquire generalizations, but it is far from being the only means. This is true for both the race and the individual. The technical generalizations in the natural sciences have all been worked out for the race by our geniuses in science, but the individual may now acquire them by reading or by word of mouth. Such generalizations as all men are mortal, unsupported bodies fall, spring rains make green pastures, never had to be explicitly worked out by any-

body. Such generalizations are now, and always have been, acquired through informal experience.

There are, then, three basic means of acquiring generalizations: (1) explicit induction, (2) implicit induction or informal experience, and (3) language, oral and written.

EXERCISES

1. May the method of difference ever be applied without controlled experimentation, that is, does nature ever spontaneously perform experiments for us in accordance with this principle? If so, cite instances.
2. Show that in astronomy, in geology, and in the social sciences it is frequently quite impracticable, if not actually impossible, for us to apply the method of difference. May we nevertheless still have confidence in our conclusions? Cite instances.
3. Outline an inductive lesson on each of the following problems:
   (1) What is meant by climate?
   (2) What are the factors that cause differences in climate?
   Show that the second problem might well be subdivided into at least two problems — temperature and moisture.

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CHAPTER V

USING RELATIONSHIPS (DEDUCTION)

1. *Meaning of deduction.* In educational literature the terms *deduction* and *problem-solving* are to a great extent used synonymously. Logically, deduction means the explanation of a particular item of experience by subsuming it under a general truth that is already known. It makes use of the generalizations obtained by induction. Thus the construction of the word *logically* in the second sentence is explained by saying that it is an adverb (general class) modifying *means*. The action of a pump is explained by subsuming it under the general principle of atmospheric pressure which is the cause of suction. Arithmetic, grammar, geography, history, physics — in fact, all of our subjects of study — are full of deductive problems. Whenever we can ask the question Why? we are almost sure of facing a deductive problem. The following instances embody deductive problems:

> While walking along the roadside in New Hampshire one summer, I saw a bush bearing dark red berries. The berries looked to me like chokecherries, with which I had become familiar as a boy in Wisconsin. My first impulse was to pick some and eat them. But were they really cherries? Might they not be some other kind of berry and be poisonous? The berries fitted my general notion of cherries, but the bush was not altogether like the wild cherry trees that I had known in Wisconsin. I therefore examined the bark and leaves very carefully. I even broke a branch and smelled it. In all essential respects this bush appeared to fit into my general idea of wild cherries. A cautious taste of the fruit finally convinced me of the correctness of my inference.

I walk along the sidewalk and in the grass on the parking something that glitters catches my eye. Thinking that it is at least a dime, I stop to pick it up. But it isn't a dime; it is a mineral of some kind. What is it? Is it worth taking along or shall I throw it away? Is it, perhaps, gold-bearing quartz, and am I on the brink of discovering a gold mine? No, it does not fit my knowledge of gold ore. Is it perhaps fools' gold or iron pyrites? No, it does not fit my notion of that either. Half-unconsciously I get out my pocket-knife and begin to scrape the mineral. It has a tendency to come off in flakes. Behold! It is mica and my problem is solved. To solve a problem like this, of course, one must already have some knowledge of minerals.

Perhaps the reader has had the experience of washing dishes and has noticed that when a tumbler is taken out of warm, soapy water and is placed mouth downward on a smooth surface, such as a table covered with oilcloth, it soon sticks. What makes it stick? Is there syrup or honey on the table? An exploration with the fingers reveals the fact that there is not. Then what causes it to stick? A little experimentation reveals the fact that the oilcloth is sucked up slightly into the tumbler as it cools. This gives the clue. Perhaps we have here an instance of suction owing to a difference in atmospheric pressure. Some further experimentation confirms this inference. When the tumbler is turned down, the air in it is warm and expanded. As the tumbler cools, the air within it cools and decreases in pressure. But as the mouth of the tumbler is sealed by the smooth surface, the air from without cannot get in and so holds the tumbler down tightly on the table.

2. *Deduction and learning.* These instances exemplify how our knowledge of particular things and phenomena is extended through the application of our general concepts. Henceforth this particular variety of bush and berry, this mineral, and this sticking of tumblers and cups is known. The deductive thought process, then, is one of the processes of learning.

The place of deduction in the use and extension of knowledge has been specifically recognized since the time of the Greeks. Plato distinguished between induction and deduction, and Aristotle worked out in practically their present completeness the principles and rules of deductive inference. The Herbartians, in their study of the learning process, centered their emphasis primarily on induction, or the acquisition of general notions, giving a place to deduction only in the step of application. What they did not recognize is that deduction functions in its own right in the acquisition of knowledge and that it is entitled to independent study in the theory of learning and teaching.

3. *Bagley's formulation.* The first person to present a distinct teaching exercise on the deductive basis and to work out its logical phases is Bagley. He did this in his *Educative Process* (pages 305–315), published in 1905. The phases he gives are: (1) the data; (2) the principles; (3) the inference or conclusion; and (4) the verification. The data are the particular facts about which a problem has arisen; the principles are the generalizations needed for classifying, explaining, or interpreting the facts; the inference is the act of making the classification, explanation, or interpretation; and the verification is the act of confirming the conclusion. The problem, which gives rise to the entire process, Bagley left implicit.

4. *The formulation revised.* In order to exemplify more fully the distinguishable phases of the deductive process as related to learning and teaching and to get a concrete basis for reconstructing these phases, let us again imagine ourselves going through a lesson with a class. Let us assume that the class has come upon the problem of why the climate along the Pacific border differs from the climate along the Atlantic border. To make the problem more specific, Why does Berkeley, California, have an equable, semi-tropical climate

with a wet season in the winter and a dry season in the summer, while Washington, D.C., has hot summers and cold winters and an approximately even distribution of rainfall throughout the year? What are the factors that give to western California an equable, semi-tropical climate?

5. *The problem.* It should be clearly recognized that the deductive thought process, like the inductive process, takes its rise in a problem. Unless there is a problem, clearly recognized, there is nothing to challenge the mind and engage the attention. The cherry bush, the mineral, and the tumbler each presented an uncertainty that gave rise to a problem. It is the function of thinking to solve problems of this nature. Thought appears when instinct and habit fail to meet the issue. The scenes along the way to and from one's place of employment are usually sufficiently familiar to attract no particular attention, but let an unusual plant, an unusual mineral, or an overflowing stream appear in one's path and our smooth-flowing mental or physical progress is interrupted. The uninformed or unreflective person may classify the plant or mineral merely as something strange and let it go at that, and the swollen stream may merely cause him to turn back and spend the day at home, glad for an excuse to have a day off, but to the person of intelligence and initiative the interruption presents a problem that calls for solution.

6. *The solution.* As soon as a problem catches one's attention, there is a tendency to suggest a solution. When the members of a class face the question of why Berkeley has a semi-tropical climate while Washington has not, a member of the class is likely to suggest that the difference is caused by a difference in latitude; perhaps Berkeley is farther south than Washington. Very well. Let us see if that difference exists. An examination of the map discloses the fact that both places are near the thirty-eighth degree of latitude. Obviously this

suggestion (hypothesis) is wrong and has to be rejected. Another pupil may suggest that Berkeley is nearer sea level, but the facts in the case soon invalidate this hypothesis. Both places are near sea level. Perhaps the position of mountain ranges is the cause of the difference. The map, as well as a first-hand knowledge of the case, reveals the fact that there are mountains directly east of Berkeley, while there are none near Washington. But do the mountains near Berkeley protect the region from the cold winds of the north while Washington enjoys no such protection? That depends on the direction of the prevailing winds. As Berkeley is in the region of the prevailing westerly winds, it cannot receive protection from mountains that lie to the east. This hypothesis, therefore, must also be rejected.

Perhaps the fact that Berkeley is nearer the ocean than Washington accounts for the difference. Although only at the head of the tidewater in the Potomac, Washington is over a hundred miles from the Atlantic, while Berkeley is within easy sight of the Pacific. But do places in California near sea level that are over a hundred miles from the Pacific have a continental climate like Washington? They do not. Therefore this hypothesis is also not adequate.

As a final hypothesis, a pupil may suggest that a combination of the prevailing winds and nearness to the warm currents in the Pacific is the cause of the difference. An examination of facts convinces the class that this hypothesis is essentially correct. The prevailing winds do come from a region that enjoys both a moderate and an even temperature. Along the Atlantic border, on the other hand, the prevailing winds come from the interior of the continent and they bring with them fluctuating, continental temperatures.

What would happen if the prevailing winds in the temperate zone were easterly rather than westerly? What difference

would this make in the climates of the east and of the west?

So much for the differences in temperature between the east and the west. But what causes the differences in precipitation? Why a dry season in the summer and a rainy season in the winter at Berkeley, Portland, and Seattle, while there are no such seasons at Washington, New York, and Boston? This is really a separate problem and is usually beyond the members of an elementary-school class. Even students who have had physics frequently have trouble with it.

Someone in the class might recall that the wind belts shift north and south with the seasonal movements of the sun, and he might suggest that the prevailing westerlies move entirely north of Berkeley during the summer. With no winds from the ocean during the summer, naturally no moisture would be brought in and there would be no rain. This sounds plausible, but if any member of the class has been at Berkeley in the summer he will at once object and say that the westerlies do blow there in the summer. This objection is correct. Therefore another clue has to be sought.

The class should be reminded of the fact that air gives up its moisture when it is sufficiently cooled, and that when the air is warmed, it will not only not give up moisture, but will have a drying effect, no matter how near the saturation point it may have been to begin with.

Another thing; which warms up more quickly, land or water? And which cools off, or loses heat, more quickly, land or water?

These questions some of the class can answer from common experience. They will have noticed that the earth gets positively hot in the direct rays of the summer sun while water gets only lukewarm. With these facts in mind they can readily see why the land would raise the temperature of the air in the summer and cool it in the winter. These are just the conditions to bring about a dry and a wet season.

7. *Factors in the solution: A. Data.* We are now ready to stop a moment and see what we did in solving our problem. A little reflection reveals the fact that we used both facts and principles. We used (1) the facts of the location of Berkeley (and Washington) in respect to latitude, altitude, mountain ranges, the sea, and the winds; and we used (2) the principles or causes that modify climate, which functioned for the time being as hypotheses or trial explanations. These two types of things are technically known as the *data* for thought.

Teachers must realize, and pupils should be led to realize, that data are absolutely indispensable in thinking or problem-solving, and that these data consist always of the two kinds mentioned. Whether the problem is inductive or deductive makes no difference in this respect. We must have one or more particular facts in respect to which the problem has arisen, and we must cast about for an explanation. This is always a generalization (principle, law, etc.) of some kind, that functions, until verified or rejected, as a hypothesis; when accepted, it explains or rationalizes the particular. Pupils should not be expected to think out problems without data. No one can just think. Thinking must always be about something (problem) and with something (data). In the cherry problem, the bush and the berries comprised the particular facts, and my knowledge of chokecherries, previously acquired, the generalization or hypothesis; in the mica problem, the mineral in hand comprised the particular and my knowledge of minerals the generalization; in the tumbler problem the behavior of the tumbler comprised the particular phenomenon to be explained and the knowledge of sticky substances and of suction or atmospheric pressure served as hypotheses.

B. Testing hypotheses. The heart in the solution of a problem is found not in the data as such, but in fitting the particular facts and hypothesis together so as to yield a reliable

and satisfying conclusion. It is here that the most exacting phases of thinking come in. Do the facts and the hypothesis harmonize? Does the hypothesis actually explain the fact or phenomenon that puzzled us or is the explanation only apparent? To answer these questions one must carefully analyze the data before him and compare them point for point with the theory of explanation advanced. If they fit together, well and good; but if they do not, either the data have not been adequately examined or another hypothesis must be sought.

In deduction as well as induction one of the most difficult phases is the finding of the right hypothesis. We noted in Chapter IV that Galileo was permanently stuck because he could not think of a hypothesis to explain the action of the suction pump. In facing a deductive problem one is supposed to have the right explanation somewhere in his stock of knowledge, but which one is it? What principle or principles shall be applied in solving a particular problem in mathematics? What causes a wet winter and a dry summer on the Pacific coast? Why are these seasons reversed in southern Mexico and Central America? The student who has studied physical geography and physics knows all the basic principles, but how do they apply? The full explanation often involves a combination of factors, as was exemplified in explaining the wet and dry seasons of California, and to think of all of these in their right connections requires mental ingenuity. Many people have all they can do to follow an explanation given by someone else, to say nothing of doing it originally. At this point no teacher can expect much from most members of the class, not even in college, yet this does not excuse him from leading the entire class square up against the problem and giving them a chance to solve it. The very challenge is the best preparation for understanding and appreciating the solution when given or found.

In the discussion of the testing of hypotheses the student of logic will recognize that we are here face to face with the methods of verifying hypotheses made explicit by John Stuart Mill. These are the method of agreement, the method of difference, the joint method of agreement and difference, and the method of concomitant variation. One or more of these methods is always used in testing or verifying hypotheses. In solving the problem of the precipitation of moisture in Chapter IV, we used the method of agreement and we used that method also in solving the various problems in this chapter. (Will the student point this out?) In ordinary classroom work, the method of agreement is usually sufficient, but in original work in science this method alone is inconclusive. The agreement noted might be merely accidental. To eliminate this possibility, the method of difference must also be applied, as was pointed out in the preceding chapter.

C. The conclusion. The accepted hypothesis in deduction, just as was the case in induction, becomes the conclusion. This conclusion is the answer to the question with which we started out. The knowledge of this fact constitutes a key that the student may use in checking up his work.

The abler members of the class will usually grasp the significance of the conclusion quickly enough, but there are likely to be others in the class who are slower in sensing the relationships involved. For them the conclusion must be written out and related to the premises several times. They are the ones who possess, in the subject in hand at least, little ability to think for themselves and who acquire a knowledge of relationships in the main only by following in the footsteps of others.

D. Verification. It is one of the ideals of scientific thought that no conclusion shall be accepted without being adequately verified. To a large extent this process is identical with testing

the hypothesis, and verification may be looked upon as an extension of that process.

In original thought, verification can be achieved only by appeal to experience or to experimentation. This method is often applicable also in the schoolroom, but here appeal to authority may also be used legitimately in many instances. This authority may consist of the textbook, a treatise, the teacher, or any other person who has adequate knowledge. Ideally, this knowledge should be based on first-hand experience.

The conclusion in the cherry problem mentioned above was verified both by tasting the fruit (experience) and by asking a resident of the region what the berries were (authority). In the tumbler problem, verification might have been carried on experimentally by using both hot and cold water and noting the results, or one might have consulted an expert or a textbook in physics. The social and scientific significance of verification is the same here as in induction.

8. *Summary of deductive solution:* The aspects involved in the solution of a deductive problem may be brought together as follows:

(1) Problem
(2) Data { *a.* Particular thing or phenomenon
b. Generalizations (used as hypotheses)
(3) Testing hypotheses (by analysis and comparison)
(4) Conclusion
(5) Verification

9. *Deductive and inductive outlines compared.* No doubt the reader has been struck by the similarity of the outlines for induction and deduction. There are slight differences, but these are more apparent than real. A problem is the point of departure in each. In the sense of using trial solutions, hypotheses function in both, but a simple deductive problem is

concerned with only one thing or phenomenon to be explained, while induction usually requires a number. The conclusion in induction is always a generalization, while in deduction it is a particular thing or phenomenon rationalized, or related to a generalization. Verification forms logically the final aspect in each. Application of the generalization for clarification and impression is brought into induction solely for pedagogical reasons. This aspect is omitted in deduction, or, more correctly, deduction is the application of generalizations, although the right generalization is not in hand to begin with as it is in the inductive step of application.

10. *Induction and deduction distinguished.* What, then, is the distinction between induction and deduction?

The distinction between induction and deduction is found in the difference in the problems involved. An examination of the problems that we have solved in this and the preceding chapter reveals the fact that in induction the problem always pertains to the making or the perfection of a generalization, while in deduction it pertains to the rationalization or subsumption of a particular thing or phenomenon. Thus, in the precipitation problem, our task was to formulate a generalization that would cover all cases, while in the cherry, mineral, tumbler, and climate problems our task in each was to rationalize (identify, or explain) a particular thing or phenomenon. All the other differences hinge on the variation in the data needed to solve the problem. We may say, then, in brief, that whenever our problem concerns the formulation or reconstruction of a principle, law, rule, or definition, it is inductive; whenever it concerns the identification, explanation, or anticipation of a particular thing or phenomenon, it is deductive. This rationalization of a particular is always made by subsuming it under a generalization previously acquired.

This distinction is a matter of logic rather than psychology;

it lies in the data used rather than in the thought process involved. Psychologically, thinking is thinking, and the terms *induction* and *deduction* are quite out of place from this angle. Whenever the psychologist discusses induction and deduction, he is trespassing on the field of the logician. As our outlines summarize the dynamic or psychological procedure in thinking, it is to be expected that they be essentially alike. But for the teacher the recognition of this similarity in the processes of solving inductive and deductive problems is not enough; he needs to be aware of the differences as well if he is to proceed with assurance. The teacher is concerned with the objective data or logical side of thinking no less than with the subjective process or psychological side. This concern is more rather than less, for the teacher deals with subject-matter first and with method second.

The distinction between induction and deduction is often made by saying that induction moves from particulars to a generalization while deduction moves from a generalization to a particular. This distinction fits pretty well what we have after a problem has been solved — that is, it describes fairly well the finished product of thought; but it is quite inadequate as a description of the dynamic act of thought. All problems, deductive as well as inductive, are suggested by particular instances, but it is not the same thing that is problematic. In deduction it is the classification or explanation of the particular itself, while in induction it is the generalization back of the particular. In neither case is the generalization given to begin with. The most difficult aspect of deduction usually consists in finding the right generalization to use in a particular problem. It exists somewhere in our stock of knowledge, but which one is it? In induction either we have never had an explanation at all, or the one we have is inadequate. For a helpful discussion of this distinction between induction and

deduction the reader is referred to Miller's *Psychology of Thinking*, pages 236–239 ('09).

11. *Dewey's distinction.* Dewey distinguishes induction and deduction as follows:

> There is a double movement in all reflection: a movement from the given partial and confused data to a suggested comprehensive (or inclusive) entire situation; and back again from this suggested whole... to the particular facts, so as to connect these with one another and with additional facts to which the suggestion has directed attention. Roughly speaking, the first of these movements is inductive, the second deductive ('10, 79).

This distinction is likely to prove confusing to the student unless he clearly relates it to the outline given in the preceding pages. What Dewey does is to call the movement from the problem to the hypothesis (our first two aspects) induction, and the movement from testing the hypothesis to the verified conclusion (our three remaining aspects) deduction. Whether the problem attacked pertains to the making of a generalization or to the subsumption of a particular is immaterial; it is the movement up to the hypothesis that Dewey calls induction, and the movement from there down to the verified conclusion that he calls deduction.

What we have here is obviously not a difference in the description of thinking itself, but merely a difference in the use of words. To what aspects of, or differences in, thinking shall the terms *induction* and *deduction* be applied? That there is such an up-and-down movement of thought as Dewey describes is, of course, true; it is implied in our outlines for both induction and deduction; but it is also true that thought faces the two types of problems that we have distinguished. To which of these differences shall the terms *induction* and *deduction* be applied?

This question, being arbitrary rather than factual or logical,

must be answered by a preponderance of usage, and usage has answered it by an almost unanimity of practice for at least twenty-five hundred years. Ever since the time of Plato and Aristotle induction has been used to designate the thought process that formulates or perfects generalizations, and deduction has been used to designate the thought process that rationalizes particular things or events. This is also the more helpful distinction from a practical standpoint. The teacher in the classroom or the scientist in the laboratory must know the type of problem that confronts him if he is to proceed with full intelligence and assurance.

12. *Relation of induction and deduction.* If it is granted that induction formulates, reconstructs, or perfects generalization and that deduction applies generalizations, it must follow that induction of some sort must precede deduction. This is true, yet in practice the two are often so closely intermingled that the time sequence between them is of little significance. Induction arises, or tends to arise, whenever deduction fails, and the results of deduction always tend to modify the generalizations used. With the subsumption of every new case, the meaning of the generalization is clarified and extended and future deductions in the same field are made easier thereby.

Miller ('09, 231) has aptly characterized induction as the making of the tools of thought and deduction as the using of these tools. Carrying the analogy further, he has likened induction to the process of inventing and making reaping machinery, and deduction to harvesting the grain. As there would be little sense in making tools and machinery without using them, so there would be little sense in making generalizations without using them in the control of conduct and activity. The two processes supplement and complement one another.

From the standpoint of systematizing knowledge, we may say that induction constructs or reconstructs the framework of a system of knowledge and that deduction fits the content into the system. Deduction always takes a system of knowledge for granted and for the time being does not question its validity. As we go about our affairs we classify one thing as a tree, another as a house, another as an airplane, and so on, without doubting the validity of the classes concerned. But should we meet with what would be for us a new thing or phenomenon, or should a division that we had made prove inadequate, we should then be face to face with a defect in our system of knowledge and would have an inductive problem to solve. We would have the problem either of making a new class or sub-class or of reconstructing a class previously made. Thus, if my knowledge of the varieties of oak trees were limited to white oaks and black oaks and I should then run across a red oak, I should have to make a new sub-class; or if the word *doctor* meant to me a practitioner of medicine and I then met a person with the title of doctor who was in the ministry, another who was a teacher, and another who was a scientist, no one of whom had studied the art of healing, I should then have to reconstruct the meaning of my class name; i.e., I would have to improve my definition of the term *doctor*.

May the same problem be attacked either inductively or deductively? For example, are the following problems inductive, or deductive, or may they be attacked by either method?

(1) Is the privilege of obtaining a divorce justifiable?
(2) Should all high-school graduates be urged to attend college?

Persons of a scientific bent are inclined to insist that both of these problems are fundamentally inductive. They would urge that in solving either of them a large variety of instances would have to be examined and that one's conclusion would

have to be in accord with these instances. If divorce in certain situations led to improved conditions, all angles being considered, it would, to them, be inductively proved that divorce under such conditions is justifiable. Similarly, if an extensive and comparative examination of instances revealed that certain types of high-school graduates are better off, all angles considered, in vocational situations than in college, one would be justified in concluding that not all high-school graduates should be urged to go to college.

From the standpoint of the Scriptures one might argue that marriage is one of the sacraments, and that man has neither authority nor power to undo one of the sacraments, once it has been consummated. This attack is deductive and may be summarized in the following syllogism:

> What God has joined together is something that no man may put asunder.
> Wedlock is something that God has joined together.
> Therefore, wedlock is something that no man may put asunder.

Similarly one might argue that education is an unqualifiedly good thing and the more of it that we can get people to undertake, the better. Getting people to go to college, therefore, must always be a good thing, for it is getting them to undertake more education.

The crux in these two arguments lies in the major premise. The validity of this premise in both cases is assumed without inductive proof. No scientist is likely to be satisfied with this. One point of view is factual or scientific and the other is authoritative or arbitrary. From the same point of view it is really not possible to attack the same problem both inductively and deductively.

The conclusion just reached is, however, not incompatible with the fact that the same problem may be deductive for one

person and inductive for another, the difference being due to the varying amounts of knowledge possessed in the field concerned. To the person who is familiar with the principle of condensation, the explanation of the formation of dew is a deductive problem, but to the person not so familiar, it must first be made an inductive problem. Teachers do well in keeping this difference in mind. They are themselves often in the former stage of development while their pupils are in the latter.

13. *Types of deductive problems.* On the basis of what is to be found, deductive problems have been divided into (1) explanatory and (2) anticipatory. Thus, in the problem, Why does Berkeley have an equable, semi-tropical climate with wet winters and dry summers? the characteristics of the climate are given and all that is asked for is an *explanation* of these characteristics. If, on the other hand, the question had been, Judging from its location — in respect to latitude, altitude, mountain ranges, winds and water — what would you infer the climate of Berkeley and vicinity to be? the problem would have been to *anticipate* the climate of the region by applying the known principles of climate.

These two types of deductive problems are found in all fields of knowledge. In arithmetic the fundamental problem is either to explain the answer or to find the answer. In language study we may ask, What is the construction of this word? (anticipation), or, Why is this word in the accusative case? (explanatory). Whenever we ask: *Why* does dew form more readily on grass than on stones? or, *Why* did you multiply instead of divide? we are confronted by an explanatory problem. When we ask: *What* is the construction of this word, and why? *Where* will dew form more readily, on grass or on stones, and why? and *How* should you solve this problem and why? we are confronted by anticipatory problems.

A little experience in problem-solving will soon convince the

reader that anticipatory problems are as a rule distinctly more difficult than the explanatory. This is owing to the fact that less is given and more is to be found. Viewed from the standpoint of the syllogism, we may say that in the explanatory type the conclusion is given, the minor premise is implied, and we have only to seek the major premise and fit it to the minor so as to yield or justify the conclusion; while in the anticipatory type only the minor premise is given or implied and both the conclusion and the major premise have to be found in the light of the problem in hand. When finished and summarized in syllogistic form, anticipatory solutions are said to be progressive and explanatory solutions regressive.

EXERCISES

1. Are there other methods of overcoming problems or difficulties besides thinking?
2. Can you identify the syllogism in the outline on page 82? Can an inductive solution be summarized in syllogistic form?
3. Distinguish between the logical and the psychological aspects of thinking. Point out that both aspects are of concern to the teacher.
4. Is it generally recognized that hypotheses are used in solving both inductive and deductive problems? Consult texts in logic and education.
5. By reference to texts in education and logic, determine which distinction between induction and deduction each follows, Dewey's or the text's.
6. Are the cherry, mineral, and tumbler problems given in the text explanatory or anticipatory? Why? Under which type does this exercise fall?
7. It appears that deduction of the explanatory type and induction both move from effect to cause. What, then, is the difference between the two?
8. What facts and what principles were used in explaining the

wet and dry seasons of the Pacific coast? Explain the wet and dry seasons in Central America.

9. Miller ('09, 260) calls the hypothesis the special device of inductive method. Show that Miller himself violates this restriction in the examples he uses on pages 262–263.

10. Show that induction may be likened to preparing the string, and deduction to stringing the beads. Induction may also be likened to making a master key for a type of lock. What would deduction be in this case?

11. There appears to be an agreement between vaccination for smallpox and immunity from the disease. Is this conclusion universally accepted? Has the method of difference been applied? How could it be applied experimentally?

12. Parker ('20, 229) says: "If Dewey's characterization of induction on page 82 of his *How We Think* is correct, most of the pedagogical discussions use the term *deduction* incorrectly." Is either side necessarily wrong? Account for the discrepancy.

13. Discuss: "The part played by induction and deduction in any example of thinking is so difficult to understand that its introduction into the discussion is of no help to the student" (Parker, '20, 229). Has Parker succeeded in making this matter easier to understand?

14. Discuss this statement: "The only basis upon which we are justified in saying that this lesson is inductive and this deductive is that when induction is *explicit* and deduction *implicit* it is an inductive lesson, and when deduction is explicit and induction implicit we have a deductive lesson" (Charters, '12, 352).

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CHAPTER VI

MASTERING PARTICULAR TOPICS

1. *Neglect of this topic.* The five-point outline, developed in the two preceding chapters, which applies only to the mastering of relationships, has for some years dominated books on teaching almost to the exclusion of the pedagogical consideration of particular topics. To this there are now two exceptions, Tompkins's "Thinking the Individual" ('94, 109–187) and Morrison's "Learning Units" ('31, 24). Morrison's unit constitutes a recognition of the particular topic, but Morrison fails to give adequate recognition to the teaching of relationships. Tompkins devotes seventy-three pages to "Thinking the Individual." His treatment is masterful, but his Hegelian standpoint and his abstract manner of treatment have placed his discussions beyond the ken of most students. His summary of the topic is reproduced as exercise 13 at the close of this chapter.

2. *Importance of the topic.* It is true that we use relationships every day and that we meet them in every subject of study, but they always pertain to particular things and phenomena which they explain and which they weld into larger units. Particular topics are inherently primary, for they are the things that are directly experienced. Relationships exist only in the identities, differences, and changes that may be observed in concrete things and phenomena, and they come to the focus of attention only when we want to gain an understanding of how things are related or how they function. The two are always found together, yet most of the topics that are taught in school are approached from the standpoint of concrete or particular reality.

The student in art wants to know Raphael's "Sistine Madonna," da Vinci's "Last Supper," and Millet's "Gleaners"; the student of literature wants to know Homer's *Odyssey*, Goethe's *Faust*, and Longfellow's *Evangeline*; the student of geography wants to know the Mississippi River, the African continent, and the earth as a whole; the student of history wants to know the Peloponnesian War, feudalism, and the life and character of Washington; the student of physics wants to know the topics of heat, light, and electricity; and so on through every other department of knowledge. These topics all involve relationships, but only for the purpose of interpreting the particular things and phenomena that we want to understand.

These two aspects of knowledge, generalizations and particular situations, are on the whole well recognized in our textbooks. A rounded text in geography has a section on the general geographical principles pertaining to the earth as a planet, its position, motions, and surface features, and the results of these conditions in respect to ocean currents, wind belts, climate, etc. These principles are then used in the study of particular regions and countries. In a narrative subject such as history and a descriptive subject such as art, principles are less in evidence, although they are not absent, while in subjects such as physics and chemistry, principles are usually in the foreground with facts and phenomena in the background.

Another need for the independent recognition of particular topics in teaching is found in the confusion and errors that have resulted from the omission. Many teachers and some writers have proceeded on the assumption that the five-fold outline is applicable to all topics. Thus Cox, in his *Literature in the Common Schools*, attempts to force the treatment of "Old Ironsides" into the five-fold outline, suggesting that the generalization to be reached is, "In the life of a nation noble senti-

ment is a vital force." Obviously such teaching distorts good literature and does more harm than good. The errors in the pamphlet referred to in Chapter IV are also owing primarily to the fact that the attempt was made to apply the traditional five-fold outline to particular topics. For these errors the writers can hardly be blamed. They were not specialists in educational theory, but, needing educational theory, they went to writers in this field and took all that was offered. Books on teaching have been sadly deficient at this point.

3. *Analysis of a particular topic.* In bringing out the phases that are involved in mastering a particular topic of some complexity, we may again resort to a concrete instance of learning. How, for example, would a person, as a sight-seer and patriotic American, proceed in gaining a knowledge of the city of Washington, the nation's capital?

To begin with, he would have to be motivated; there would have to be some reason for spending his time, effort, and money in becoming acquainted with the city. Having received his inspiration, he would pack his automobile or invest in a bus, railroad, or airplane ticket and start out. Upon arrival he would quite naturally buy a guidebook and study the lay of the land. He would want to know the general plan of the city in order to locate the places of interest. With this outline in mind, he would next get down to the details. He would visit, inspect, and study one by one the places that he had marked out for investigation. The order of attack would in general be determined by his outline, but this need not be unchangeable and need not be twice alike for different individuals. Finally, after he had seen all that he had planned, or had found time to see, he would again sit down with his guidebook and map and sum up, systematize and fix in his mind the things that he had seen, ready now to make impressive use of his knowledge when he gets home.

In this procedure four phases may be distinctly identified. These are:

1. Recognition of the topic, plus value and setting
2. The introductory or outline view
3. The study of details
4. Organization and summary

These four phases, or something like them, are inherent in the rounded study of every particular topic. The reader may easily verify this by noting how he would proceed in studying the geography of India, the history of Japan, or *The Lady of the Lake*. The term *topic* rather than *problem* is chosen because the latter does not fit well here. There really isn't any problem to be solved, but factual knowledge to be gained. Explanations and interpretations often come in, especially in expository topics, but these are not primary and fall naturally under phase three, as an aspect of the study of details. This aspect represents the analytical phase of the movement. It is here that the thing or topic before us is taken apart and each part is studied by itself and in its relation to the other parts and to things outside. In education, as in war, one must divide in order to conquer.

An introductory or outline view is indispensable, especially in topics that are complex, for without it the student can distinguish neither beginning, middle, nor end; he has no plan for evaluating and placing details. The summary forms the capstone of the process; it reassembles into a unitary conception what the study of details has taken apart.

What we have in this outline for the teaching or learning a particular topic is an example of the movement from the whole to the parts and back to the whole again. A particular is unknown or baffling; it puzzles us, and we feel the need of understanding it. We attack it, first to survey it as a whole and then

to analyze and master its various parts and aspects. Finally we bring all the parts together again so that we once more have a unified view. We have moved through analysis and synthesis from a particular thing or topic that was vague and confusing to a particular that is clear, unified, and meaningful.

4. *Types of particular topics.* Tomkins ('94, 115) points out that particular topics may be thought of as either (*a*) static or fixed, or (*b*) as dynamic or changing. The Panama Canal could be studied as it now is or in the light of its origin and development; feudalism could be studied as a fixed institution, say by viewing it in cross-section as it existed in the tenth century, or it could be studied in its origin, development, climax, and decline; a tree could be studied as it exists at present, with all its parts and attributes in place, or it could be studied in its course of development from the seed, with its parts and attributes appearing consecutively; and so on for every other particular thing or topic. Every thing, institution, or conception has specific characteristics as it now exists, has existed, or will exist, and it also has, has had, or will have, a history.

This distinction is likely to impress the reader as new and unfamiliar. That is because Tompkins has his attention on the realities themselves rather than upon the written accounts of what others have said. When our attention is shifted to these written accounts, we recognize the familiar distinction of description and narration. The static or fixed view gives rise to description, the dynamic or changing view to narration. We are here, in fact, face to face with the types of discourse recognized in rhetoric. These are, however, not two, but four in number, being description, narration, exposition, and argumentation. When dealing with books, from which studying in school is primarily done, these four types of discourse are also the types of particular topics met in teaching. These types of topics are not restricted to particular subjects and

they are seldom met in pure form, yet it may be said that history and literature abound in topics that are primarily narrative; geography, art, and natural history often involve description; while the topics met in the sciences — natural, philosophical, and humanistic — are mostly expository. Argumentation is exposition whose purpose is to convince rather than to instruct; it is met in literature and in oral discourse such as abounds in political campaigns.

The identification of these four types of topics is of basic significance from the standpoint of subject-matter, but it is of little significance from the standpoint of general teaching procedure. The adequate development of each type of topic involves the same four phases brought out in the preceding section. Whether the topic is primarily descriptive, narrative, expository, or argumentative, we must take our point of departure from a clear recognition of what we are facing, we must get an outline view of the situation, we must dissect the situation by analytical study, and we must bring the whole together again. Deductive explanation and inductive integration will be especially prominent in the third phase of expository and argumentative topics, although it need not be absent from any; neither need description and narration be absent from expository and argumentative topics.

5. *Developmental and expository teaching.* It is worth pointing out that *all* topics, even those discussed in the two preceding chapters, may be taught by the four-point outline. Whenever textbooks and lectures are used, the four-point outline applies. The five-point outline applies only when teaching is developmental, and developmental teaching, in the strict sense, can be used only when relationships are being traced out. In this type of teaching, the teacher and pupils attack problems together *before* they have been studied in the textbook. The teacher is the moderator whose primary function

it is to direct the mental activity of the pupils, leading them to see and appreciate the problem, guiding them in the gathering of data, and assisting them in the testing of hypotheses. The whole undertaking is a give-and-take procedure which obviously could not take place in a pure form *after* the topic had been studied in a textbook. Topics like the condensation of moisture and the climate of Berkeley, California, can be assigned for study in books, and usually are, but then the teaching becomes expository rather than developmental and logically follows the four-point outline. Even then there is usually plenty of thought work to be done in developing adequate understanding, which now has a place under aspect 3, the mastery of details, which includes the details of understanding.

To say that expository teaching is not primarily developmental is not to say that it may not be dynamic and vital. One may be just as dynamic and vital as the other. So far as we now know, the determining factor is the teacher. One appears to succeed better with one mode of procedure and another with the other. Whenever the full interest and participation of the pupils is enlisted, teaching is dynamic and vital. This applies not only to expository topics, but also to those that are primarily descriptive or narrative. The primary question in teaching never is, What method are you using? but, Are the pupils getting it? As yet no controlled experiments have demonstrated one of these modes of procedure to be inherently superior to the other. Usually, of course, they run hand-in-hand so that a class is getting the benefit of both.

6. *The study of types.* The four-point outline applies in essence also to the teaching of types. By a type is meant a particular that is representative of a class. Thus, in zoölogy the crayfish may be studied as representing the crustaceans, the fly as representing the insects, and the perch as representing

the fishes. In geography the Mississippi may be viewed as being typical of a large class of streams. The same principle holds in botany, industry, English, and other subjects. In English we find a course called "Types of Literature," and it is true to its title.

The intensive study of botany, zoölogy, and some aspects of geography and industry would be practically impossible without resorting to type studies; the host of particulars is too great. Furthermore, the work would soon become futile, for it would consist of stupefying repetition. Groups of particulars in these and other subjects are fundamentally alike and it is entirely reasonable that education should take advantage of this similarity.

7. *Example of type study.* As an example of type study in geography we may take for consideration the nature and meaning of a trade center, or, which is practically synonymous, the nature and meaning of a city. What causes so many people to congregate at one point? What do they all do for a living?

Concreteness and definiteness would make it desirable that this topic be approached through the study of the local community or of a near-by city with which the pupils are acquainted, for every village or crossroads settlement is a trade center. The approach by means of a small city has distinct advantages, for there the employment of nearly every adult person may be determined. A large city is essentially only more complex, but it is likely to be so much more complex that the beginner can gain no unified conception of it.

In broad outline it may readily be seen that even a small city has a business district and a residential section. As the city grows larger there are likely to be several such sections, and there are likely to be also manufacturing, wholesaling, and shipping sections. Educational and governmental institutions occupy prominent positions in some cities.

The detailed study may well begin with the city's geographical setting. What determined its location? Was it the presence of water power, coal for manufacturing, or transportation facilities? Was it located near raw material, such as iron or forests?

What is the relation of a city to its hinterland? Note that grain, fruit, and stock farmers and other individual producers need both a market-place for their products and a trade-center for supplies. A city is seldom if ever sufficient unto itself; it is to a great extent a place of production, distribution, and exchange for a large area. The larger the city the larger this area is likely to be, including not only the surrounding country, but other cities and distant lands. Consider such places as Chicago, New York, and London in this respect.

Next the number and types of people employed in each industry may be taken up. How many persons are employed in manufacturing? in trade? in shipping? and so on. How many families do these represent? About what is the average size of these families? What population have we accounted for already?

Note also that the congregation of people in cities itself gives rise to employment. Whom do the people in shops, markets, restaurants, and libraries largely serve? How many people are employed on the police force, fire department, and other divisions of the city government? How many people are employed in building construction? Street repair and extension? Telephone service? In the schools, churches, medicine, law, etc.? How many people who have retired from active life are living in the city?

In a manner something like this a meaningful conception of a city may be built up. But when this has been done for one city, it need not be done in detail for other cities. All

that will be necessary will be to note the basic industries and the outstanding differences.

In summarizing a topic like this, it is not sufficient to list the populations in these groups, sum them up, and arrive at the population of the city. The summary should bring out also the organic unity of the city. "Our city" should thereafter really mean *our* city. The pupils should see that each resident is a part of an organism or institution. This gives advantages and entails duties. What are these? What specific advantages of city or community organization are you enjoying? How can we aid in maintaining and extending these advantages? Provided that the teacher does not preach, is not sentimental, real progress in civic insight and attitude may be made.

8. *Types and induction.* So far we have looked upon a type merely as a particular, but it is more than that; it embodies also a generalization. The type stands for a class and implicitly it involves a definition. To bring out this general feature it is desirable that a number of related particulars be briefly studied in addition. After the crayfish has been studied in detail, it is well to examine briefly also a lobster and a crab; after one city has been carefully studied, it is well to bring up for comparison several other cities. A formal definition of the topic in hand need not be attempted, yet the pupils should think of the outstanding characteristics as standing for a class rather than for the individual. A type study is really the combination of the study of a particular and of induction. The content studied is mainly one particular, but the purport of the study is a general notion.

9. *Summary of procedures in gaining knowledge.* We have now completed our survey of the procedures involved in developing those outcomes of teaching that go by the name of knowledge. We found in Chapter III that there are basically

only two types of knowledge — knowledge of particular things and events, and knowledge of relationships between these particulars — and one might expect that there would be in this field also two basic types of teaching procedures. This expectation is correct. We have already noted that the four-point outline summarizing the aspects involved in teaching or studying a particular topic applies in principle to all types of particular topics. The same thing holds also for the five-point outlines that we have developed for induction and deduction; these are essentially alike. The variations that may be noted are variations brought about by differences in subject-matter. The data used in induction differ from those used in deduction, but the learning procedures are essentially alike and it is the learning procedures that the outlines summarize. Similarly, the data in a narrative topic, like a novel, differ from those in an expository topic, like the working of a steam engine, but the learning procedures follow the same general outline.

It has been our primary intention so far merely to bring into relief the aspects involved in acquiring and teaching the different types of knowledge; the use of these aspects in the classroom will come up for more detailed consideration later.

EXERCISES

1. Point out that Morrison's procedure for the teaching of a unit ('31, 255–318) follows our four-point outline.
2. In studying things, such as plants and animals in biology, what is the difference between parts and attributes?
3. Look over the lesson topics developed by McMurry ('03), pages 13–41 and 257–287. Under what type does each fall?
4. How may narration, description, exposition, and argumentation be described and distinguished? What is the function of each?
5. Does the four-point outline apply to becoming acquainted with such topics as a new word, a person, a flower, a fruit, a tool?

6. In what respects are rhetoric and the principles of teaching alike? In what respects different? What is the purpose of each?

7. What would you consider proper motives for studying *The Lady of the Lake*; feudalism; the Peloponnesian War; the national capital?

8. Show by outlining specific lessons that the four phases brought out in the chapter are applicable to each of the four types of particular topics.

9. Why cannot a particular topic, as the life of Socrates or the government of England, be developed by reflective thought in accordance with the five-point outline?

10. In solving thought problems we noted that the conclusion was the answer to the question with which we started. Is there a corresponding relation in mastering particular topics?

11. While it is granted that argumentative essays and orations may legitimately be studied in school, is it proper for the teacher to resort to argumentation in his teaching? If not, what is the goal of teaching?

12. Which should precede, the study of our government as it now is or as it has historically developed? The problems of philosophy or the history of philosophy? Why? Do you see any objection to pursuing both aspects simultaneously?

13. Tompkins ('94, 152) summarizes his discussion of "Thinking the Individual" in the following outline:

Thought Relations Constituting the Individual

I. As coexistent, or fixed
   1. By means of attributes
      a. Relations
         (1) Purpose and means { True / Beautiful / Good }
         (2) Cause and effect
         (3) Time and place
      b. Properties
         (1) Primary

(*a*) Extension { Form / Size
(*b*) Resistance { Active / Passive

(2) Secondary
(*a*) Color
(*b*) Sound
(*c*) Odor
(*d*) Taste
(*e*) Mere tactile sensation

2. As made up of parts
a. Analysis by the laws of partition
b. Attributes of each part as of the whole

II. As successive, or changing
1. As a whole, under the relation of
a. Purpose
b. Time (Place may be required)
c. Cause and effect
d. Likeness and difference
2. As composed of parts
a. Analysis into parts by the laws of partition
b. Each part presented under relations of the whole.

(1) Can you fit the essentials of this outline into our four-point outline?

(2) What appears to be the difference in the points of view from which these two outlines are constructed?

(3) Justify the inclusion of relations under attributes.

(4) Why include likeness and difference under II and not under I?

(5) Are all the possible types of natural relationships included by Tompkins?

(6) Can the division of properties into primary and secondary be justified?

SELECTED READINGS

Morrison, H. C. *Practice of Teaching in the Secondary School*, 255–318.

Tompkins, Arnold. *The Philosophy of Teaching*, 109–182.

CHAPTER VII

THE ORGANIZATION OF KNOWLEDGE

1. *Organization and understanding.* In the field of knowledge the immediate objective of teaching is clearness of understanding. An item of knowledge, large or small, is understood when it is seen in its relationships, or to the extent that it is seen in its relationships. This understanding, in ultimate essence, involves only two factors: (1) an acquaintance with the data in the field concerned, and (2) an awareness of the relationships that these data bear to one another and to other things. One understands the working of a pump when he knows its parts, when he knows the functions of each part, and when he knows the natural and mechanical principles lying back of the operation of the parts so as to elevate water. In the pump these are the principle of the lever (handle) and the principle of atmospheric pressure working in combination with the valve.

Knowledge that is understood is organized, and organized knowledge — that is, organized in the mind of the student — is understood knowledge. The data mentioned in the preceding paragraph are the particular things and phenomena discussed in Chapters III and VI, and the relationships are the generalizations discussed in Chapters IV and V. Hence some of the factors involved in the organization of knowledge have already been surveyed by implication. It now becomes our duty to survey all the basic factors and make them explicit, even though this will lead the reader into fairly deep water unless he is familiar with the subject-matter of logic. The topic needs to be understood because the ability to organize knowledge is universally regarded as one of the basic aspects of good teaching.

2. *Factors in organization.* The conception of the organization of knowledge plays right into the hands of the *gestalt* conception in psychology, or *vice versa*. Knowledge functions in our minds, not in the form of isolated bits, but as unified patterns or constellations. The pump, when understood, is such a pattern. Understanding the solar system, the earth as a planet, the United States, and the word *geography* are such patterns. In history a knowledge of the Periclean age, of feudalism, and of Napoleon are such patterns.

The questions that bring into relief the factors in a pattern or system of knowledge are all included in the following lines from Kipling:

> I keep six honest serving men;
> They taught me all I knew;
> Their names are What and Why and When
> And How and Where and Who.

The question, What for? which calls for function or purpose, may also be significant.

The question *what* directs our attention to the things and phenomena that form the substance of our experience and resultant knowledge. In the solar system we have the sun, the planets, and their satellites as things, and their motions and changes as phenomena. In history we have men and institutions as things, and the doings of men and the evolution, functioning, and decline of institutions as phenomena. These things we can experience either directly or through symbols, such as words. This, however, is only the beginning in understanding. We want to know also the functions or purposes of the various elements, the causes of all changes, the laws according to which changes take place, and the answers to questions of *when* and *where*.

Functions and purposes are conceptions of value rather than

understanding, yet our knowledge would be blind without them. One function of leaves is to extract carbon dioxide from the air, the function of the heart is to circulate the blood, the function of the carburetor is to vaporize the gasoline and mix it with air, and the function of a valve is to keep a liquid from running back. The purpose of the carburetor is to make an explosive mixture for the engine, the purpose of the automobile is to furnish transportation, and the purpose of the pump is to elevate water so that we may have it to use. The word *purpose* we use when we speak of man's own contrivances and efforts for the satisfaction of his own wants, while *function* we use for designating the work that a part of an organism, of a machine, or of an institution does in the operation of the whole. Whether the whole is a product of nature or of man makes no difference. That is, *purpose* implies conscious intent, while *function* does not.

3. *The time factor.* The question *when* directs our attention to time relationships. This is conspicuous in all narrative material, of which history, which touches everything, is the outstanding example. The orderly arrangement of the items in all narrative accounts quite obviously involves the time factor. This factor helps us to gain grasp, to follow causal sequences, and to recall the knowledge when needed.

4. *The space factor.* The question *where* directs our attention to space relationships. It is clear that in machines, and in all other man-made things, every part must be in its place in order to function properly with every other part, but things in nature and in society also have their appropriate places. The solar system becomes a system in one's mind when the sun and the planets are seen in their spatial relation, one to another. The continents, the nations, and the provinces of the world form a spatial pattern that the study of geography makes explicit. Wherever we meet description we also meet

the problem of spatial arrangement, in the imagination at least.

5. *The causal factor.* The patterns of knowledge that we meet in the various school subjects are not like a mosaic, with each item fixed and quiet in its place, but they are more like the pattern of Yellowstone Park, with its geysers, springs, and cascades, teeming with activity. This activity we naturally want to understand, which brings us to the questions *how* and *why*.

The question *why* was the primary burden of Chapters IV and V and so need not detain us long here.

Causes must first be ferreted out — the inductive process — and then they must be used to interpret the phenomena about us so that they may be comprehensible to us — the deductive process. The space and time relations of a geyser are to us of little consequence; what we want to know is how it works. We want to know what the principle underlying its operation is, and how this principle functions. This is the situation in respect to all natural and social phenomena and it is the function of the natural and the social sciences to supply us with this information. The understanding of causal relationships is basic in the organization of knowledge.

In the pure sciences the questions *why* and *how* direct our attention respectively to the principles and to the laws of nature. The word *principle* as here used is merely another name for cause, while a *law* expresses the uniformity with which a principle works itself out into phenomena. The principle or pull of gravitation, according to the Newtonian standpoint, exerts itself between bodies directly as the product of their masses and inversely as the square of the distance between their centers of mass. This is the law of gravitation.

In the world of nature causal principles function spontaneously in giving us nature's laws, but in the arts and pro-

fessions, such as painting, teaching, and engineering, man himself applies the principles and laws of nature to the achievement of his own goals. This gives us techniques and procedures which we express as rules. These rules, as a little reflection will show, are closely akin to the laws of nature, getting their sanction from them. Just as a natural law is the formulation in words of the manifestation of a principle, or a group of principles, so a rule is the formulation in words of the uniform manner in which natural forces, combined with human skill, may be applied in achieving a practical goal. The procedures of teaching given in this and other pedagogical texts aim to apply the principles and laws of learning. The rules in arithmetic are the directions for applying the principles of number relationships. Thus we see that the applied sciences are intimately related to the pure sciences.

6. *The grouping of experiences.* We have now noted how three of the generalizations (which express relationships) brought out in Chapter IV function in systematizing knowledge. These are principles, laws, and rules. In that chapter is given a fourth generalization, namely, the definition. Definitions are used whenever we wish to group things or phenomena into congruent classes, each designated by a specific name or term. In logic this gives rise to the topics of definition and division, which always function together in the organization of knowledge. Human beings have been divided into five races, each one of which may be logically defined.

When I faced the problem of systematizing the means of vitalizing teaching ('23, 19), it was at once distressingly evident to me that I had a heterogeneous mass that could not be arranged into one consistent sequence. Specimens and models, for example, did not seem to mix with projects and dramatization. It seemed necessary, therefore, first to divide the list into two or more homogeneous groups, if possible. I submitted

this problem to my class and after a variety of suggestions we decided to make two groups, calling one *objective* and the other *subjective*. This, we soon saw, harmonized the matter with the two basic elements in the school, the curriculum, and the child, topics that we had discussed earlier ('23, 11).

Whenever one faces a situation, such as the preceding, one may be stumped for a time, but if he keeps on examining and comparing the items, he soon gets suggestions (hypotheses) from the items themselves. These he may try out. If the first one does not work, he may reject it and try another. This is what one must do when systematizing material for one's self instead of following the system made by another.

All the knowledge that we have is arranged in related groups, each group containing relatively homogeneous material. Beginning with our stock of knowledge as a whole, we may first divide it into two large subdivisions on the basis of whether the data are produced by man or are existent in nature irrespective of man's activity. This gives us (1) the humanistic sciences and (2) the naturalistic sciences. Each group may now be subdivided further and further until we come to the smallest class, or even to the individual item. Each group, although not the individual, may be explicitly defined, which is necessary whenever we want to insure a precise use of terms. A humanistic science may be defined as a science whose data are produced by man or result from his activity, such as literature and history, and a naturalistic science as a science whose data are given by nature, irrespective of man's activity, such as physics and biology.

Before one can proceed with a division, he must have in mind a basis for making it. Before we could divide the world of knowledge into humanistic and naturalistic, we had to locate and distinguish the characteristics (1) man-made data and (2) nature-made data. These are implicit definitions, for

they are the *differentiæ*. A definition, on the other hand, divides a group of things or phenomena off from all other things or phenomena. Because of this reciprocal relationship, texts in logic point out that definition implies division and that division implies definition.

The bases of the divisions or groupings that we make always depend on the purposes that we have in mind. Like rules, but unlike principles and laws, definitions are not found in nature, but are made by man for his own convenience. Broadly speaking, we have two types of purposes in making divisions: (1) theoretical or pure scientific, and (2) practical or applied scientific. One gives us the so-called pure sciences and the other the so-called applied sciences, although either purpose may be used without dealing with a science as a whole. When I arrange flowers according to their genetic relationship, I have a theoretical purpose in mind; when I arrange them according to their color, I have a practical purpose in mind. The immediate goal of theoretical purposes is clearness of understanding; that of practical purposes, control or use, either for economic or esthetic ends.

7. *Sequential arrangement.* After all the topics or units of a subject of study have been divided off, we face the problem of bringing them together again. After you, as a teacher, have decided what topics you want to treat in a certain course, you must also decide upon the order in which you wish to take them up. You may, of course, follow a textbook, but in that case the author had to settle the problem. He had to decide upon some order of sequence and the chances are good that he had in mind some principle to guide him.

In the subdivisions of mathematics, such as arithmetic and algebra, the order of topics is determined very largely by the nature of the subject-matter itself. In algebra, for example, one cannot very well begin with the quadratic equation and

then move haphazardly in any direction thereafter, but one must begin with elements that the beginner can understand and then move to more complex problems that rest upon these elements. Such a subject, we say, unfolds logically, and for the sake of understanding we must pay attention to this unfoldment. Broadly speaking, we are here following a causal or genetic chain.

Whenever complex knowledge patterns involve simpler or more elementary patterns, it is only common sense to proceed from the simpler to the more complex. We do this in mathematics and in logic, supposedly, but even in these subjects different writers follow somewhat different sequences. In the content subjects this divergence is still greater. Some books, in Education for example, seem to be quite devoid of any plan of chapter arrangement whatever, as if the topics had been drawn by lot from a hat, but that is not true of all. Most writers consciously adopt some plan of unfoldment, which they would always do well to make clear to the reader.

A mathematics subject, such as algebra, may be likened to a mountain gorge that must be entered at its mouth if one wishes to go through it, but a content subject, physics, or economics, or principles of education, is more like a field that may be entered at any one of a number of points and explored systematically. Every fact has a number of logical connections with other facts, any one of which may be logically followed. Knowledge facts may be likened to the atoms of chemistry, each one of which may unite in various ways with other atoms to form molecules of different descriptions. This gives students and writers a large amount of leeway to follow their own tastes in sequential arrangement.

When I faced the problem of arranging the objective and subjective means of gaining realness in teaching into helpful sequences ('23, 21), various principles suggested themselves

and I adopted the order of nearness to reality. This appears to serve very well for the objective or curricular items, but not so well for the subjective or activity items.

One text in high-school physics that I am acquainted with treats electricity in the middle of the book and light at the end. This is explained in the Preface as being dictated by the seasons. The cold, crisp days of winter, when the humidity of the air, especially indoors, is low, are ideal for working with electricity, but for working with light we need sunshine, such as we have in May and June.

The preceding paragraphs apply to the sequence of topics in expository subjects. The matter is not very different in narrative and descriptive subjects, such as history and geography. The sequence of topics in history is determined to a large extent by the chronological order in which the events happened, but as many events happened at the same time this order must be supplemented. As a rule, one line of development is traced for a while and then another one is picked up and traced. The order of treatment is determined either by the causal influence that the events bore upon one another or by the author's conceptions of their importance as measured by his idea of history.

In geography the contiguity of countries is usually one factor in determining sequential treatment, but as most countries have more than one other country in contact with them, some other principle must come in to determine priority of treatment. Whenever we are in doubt about a sequence, the alphabetical sequence may be a good one to fall back upon.

There is no one principle, then, that determines the logical sequence of topics in a system of knowledge. Time relations, space relations, and causal relations all have a place, but these are supplemented by alphabetical arrangements and many others. Because most subjects may be attacked at any one of a

number of points, and because facts have more than one logical connection with one another, sequential arrangements may vary widely and still be logical.

8. *Procedures in organizing knowledge.* Subject-matter is teachable to the extent that it possesses meaning, and it possesses meanings to the extent that it bears relationships to other things and phenomena both in science and in life; i.e., to the extent that it occupies a place of significance in a system of knowledge. Things without meaning, or that are out of their relationships, may be memorized and may require the presence of a taskmaster, but they do not require the presence of a teacher. Teaching means primarily leading others to understand, but before understanding can ensue, it is necessary to supply or recall data, for there must be something to understand. Data and relationships are Siamese twins.

9. *Reviews.* Intelligent teaching pays attention to systematization as topic follows topic and as lesson follows lesson, but this does not always permit the proper elucidation of the more far-reaching relationships. To bring these out it is wise to stop occasionally and hold a review. This gives perspective over a larger field and enables one to integrate the smaller units met from day to day into a larger and more meaningful whole. At the end of the term the entire course should be organized into a single unit. Reviews conducted with this end in view do involve a certain amount of repetition, but that is not their main purpose.

The ingenuity and resourcefulness of the teacher is nowhere brought to the test more thoroughly than in the review exercise, which might wisely be renamed the organization exercise. For a teacher to take a class over a study a second time as he did the first time, merely making the assignments longer, may refresh facts for examination purposes, but it does not add to the student's insight, and the competent stu-

dent is greatly bored thereby. Unless the teacher has succeeded in bringing out new insights, altered perspectives, and different points of view, and unless the exercise has had a vital appeal for the class, the teacher has not succeeded with his review exercise.

There is no subject of study in which it is not essential for the teacher to take time periodically to integrate the material so far presented. It is easy for the teacher to lose sight of the beginner in this connection. The teacher, personally, has been over the field before and sees the relationships, but the beginner has his hands full with the data immediately in hand from day to day. If he is to gain a larger vision, time and opportunity must be taken for it. In this text, for example, Chapters IV to XIV form one large unit, with each chapter a subsidiary unit, but few students see the larger unit unless the teacher gives them opportunity and assistance. The outline on page 50 is helpful in bringing out the larger unit.

Geography may be taken up primarily by countries or by regions, but no matter how the book does it, the teacher should lead his class to view it from both standpoints before he is through. If the book takes up the subject by countries, then reviews by regions are in order, and *vice versa*. If the text in physics is largely theoretical, then reviews may hinge about the practical applications, or if the book does not bring out historical relations, then the review may center about the men who developed physics.

My high-school teacher of American history succeeded in making the review phase even more interesting than the original presentation. We went over the subject the first time in the usual chronological manner, taking up the various topics abreast, which was the plan of the text. After the field had been covered in this manner, we took several weeks to review or integrate the subject by tracing threads of development

from their beginning to the present. Among such threads I recall the territorial growth of the United States, westward expansion, slavery, states' rights, politics and political parties, industry and commerce, science and invention, including especially means of travel and communication, and cultural life and achievements, including literature, art, and music.

10. *Correlation and credits.* With the multiplication of studies in the curriculum and with the increasing specialization in teaching, the complaint is becoming more and more frequent that our students are no longer getting an integrated education, but that they are getting little more than dabs of unrelated information. This unfortunate tendency is furthered by our mechanical ways of giving credit. Granted the inclusion of certain required subjects, the high-school student is given his diploma when he has accumulated sixteen units, and the college student is given his degree when he has accumulated with satisfactory grades one hundred and twenty semester hours.

There are two problems presented here, the problem of avoiding the isolation of subjects owing to specialization and departmentalization, and the problem of basing credit on something more substantial than the Carnegie unit or the semester hour.

The difficulties brought in by specialization and departmentalization may be mitigated by the correlation of subjects in the curriculum and by the conscious efforts of teachers to relate their subjects with other subjects and with the world outside. English literature may be placed in the same semester as English history, and American literature in the same semester as American history.

This principle is sound enough, but not all subjects that are related can be brought into temporal juxtaposition in this way, and even if they could, the teachers concerned would still

have to bring out the relationships involved. The teacher of American literature would not only have to know American history, but he would also have to make an effort to integrate the two. This he could do, and should do, even if the subjects were not being studied at the same time. Thus the matter resolves itself finally into throwing the primary responsibility for correlation and integration on the teacher. Specialization on the part of the teachers should, indeed, include depth and mastery in a restricted field, but it cannot omit a familiarity with collateral subjects and a knowledge of the way these subjects are being used in life.

The problem of basing credit on achievement rather than on single courses is now being attacked in many of our colleges. Comprehensive examinations designed to test insight and attainment are used to supplement or displace credits for single courses. Granted that these examinations are well framed, that they call for the larger and more permanent outcomes rather than for a regurgitation of details, they should go a long way in solving the difficulty. The reform must be carried into the high school no less than into the college.

A long administrative experience has convinced me that the damage done by our mechanical way of assigning credit is easily exaggerated. There are a few students who have their eyes primarily on piling up credits for a degree, but there are at least as many, if not more, who have their attention primarily on gaining insight and understanding and who think of credits only when they are forced to by administrative necessities. Those between these two extremes are no doubt influenced by both aspects, but they know that education and not credits is their primary concern.

And another thing: a student's selection of courses that looks chaotic and unbalanced on paper need not produce a corresponding effect in the mind of the student. In talking

with students I have been impressed again and again with the fact that they have feelings of need and powers of assimilation and integration of their own. Curriculum requirements set by the faculty, based, presumably, on sound educational principles, should of course, be met by the student, but beyond that his educational interests are usually served best by giving him freedom to satisfy his own mental needs.

EXERCISES

1. Show that our knowledge and the world in which we live are counterparts. Contrast with attitudes.
2. What is the difference between rationalized and unrationalized knowledge? Give examples of each.
3. What is the difference between function and purpose in the world of nature and of man? What is value?
4. List three instances of the use of rules in solving problems. Where do these rules get their validity?
5. "Cramming is usually just as sensible as the purpose for which one is obliged to cram." Is this always true?
6. Morrison makes the category of non-teachable material. What does he mean? What makes material teachable?
7. Should the term *review exercise* as used in the text be superseded by some such term as *organization exercise*?
8. Point out that division and sequential arrangement are the factors that underlie our patterns of knowledge in every field.
9. Point out that the organization of knowledge becomes progressively more comprehensive as one proceeds upward in the school system.
10. Show how the cause for any particular effect, such as the accidental shooting of one child by another, may be traced back to an ultimate cause.
11. Examine three textbooks in different fields and determine, if you can, what principle each author had in mind for arranging his sequence of chapters.
12. Students not infrequently say: "When I have satisfied these

required subjects, I am going to take what I really want and need." What does this signify?

13. "If there is not an impending examination, the student is likely to approach the doing of review exercises with an attitude of indifference." Why is this?
14. Compare the functions served by a causal principle in nature (condensation, for example) and by a definition (adverb, arthropod) in the organization of knowledge.
15. Show that the organization of knowledge discussed in this chapter has reference to organization in the mind of the student. When is organization in the text organization for the student?

CHAPTER VIII

THE LOGICAL AND PSYCHOLOGICAL ASPECTS OF METHOD

1. *Meaning of the terms.* In taking up the topic of logical and psychological methods with a class of teachers some years ago I asked: "What do these terms mean?" The one I called on replied: "Really I don't know, but I have always thought those terms sounded well." I have since discovered that these terms do little more than sound well in the minds of most teachers. The fault is not with the teachers, but with the way these terms have been used.

Before attempting to define these terms, let us first cite two instances of schoolroom learning and note the aspects and movement that are involved. In taking up a discussion of the causes of the Revolutionary War, a teacher would naturally begin quite informally and let the pupils do most of the talking. The causes would be listed on the blackboard in the order mentioned, which might be any order whatsoever. At this stage the order is immaterial, for the point is to become thoroughly acquainted with the causes themselves. Each of these would, therefore, be fully discussed to bring out its significance, but the teacher would not leave the matter at this point. He would see to it that the causes were put into some logical order, again with the active coöperation of the pupils. The teacher might ask, Which of these causes are primary and which are secondary; that is, how are they interrelated? This would stimulate the arrangement of the causes in the order of their causal significance. Another order of arrangement might be their sequence in time. Which came first?

second? and so on. Whatever order be adopted, it would become evident that the logical arrangement clears up the meaning of each cause still further and reveals the cumulative effect of all of them in combination. That is, the systematization of data is no less an aspect of learning than the gathering of data.

When I was working out the means of vitalizing teaching ('23, 19), I brought the problem up to the class from the beginning and we listed all the means that all of us together could think of. The result was a list of twenty items. These we discussed to bring out their meaning and usefulness. The list as it stood had no system or order in it; it was chaotic. The next problem, therefore, was how to systematize these items. How may they be arranged so as to present a semblance of order? This problem we again attacked together and we came out with two main subdivisions, objective and subjective, and with the items in each subdivision arranged respectively according to their nearness to real things and real activities.

An examination of these two instances of teaching and learning reveals: (1) a movement from the data in chaos, relatively, to the data in system, relatively, and (2) a participation of the pupils throughout. To be appreciated, data must be handled, in discussion at least, and relationships, to be understood, must be thought through.

These aspects of the teaching-learning process may be summarized by the following formula:

$$\frac{\text{Data, haphazardly arranged} \rightarrow \text{data, logically arranged}}{\leftarrow \text{Pupil participation throughout} \rightarrow}$$

Now to what shall the terms *psychological* and *logical* be applied in this formula? There are at least two possibilities and it is not clear to which one of these the terms are applied

in current educational literature. The term *psychological* may be applied either to (1) pupil participation, the aspect below the line, or (2) to the left half of the formula, the gathering of data with the aid of the pupils. If the first meaning is adopted, then the term *logical* applies to the aspect above the line, the data; and if the second is adopted, then it applies to the right end of the formula, the systematization of data with the aid of the pupils. The second meaning could be indicated by drawing a vertical line through the center of the formula. That is, one meaning applies to the formula vertically and the other horizontally.

Logical consistency favors the first of these two meanings, for the logical aspect of thought has reference to the data used in thinking, and the psychological aspect to the mental processes used. This distinction follows the distinction between the fields of logic and of psychology in respect to the study of thinking. It is in harmony also with the two basic factors of the school, the curriculum or subject-matter on the one hand, and the child or learner on the other. When the terms are used with this meaning, it becomes absurd to say that the movement in teaching is from the psychological to the logical, for there can be no crossing of the line; but this expression does have meaning under the second usage indicated above. Good teaching does move from left to right in reference to the formula, but this movement is recognized and significant also in the former usage. If we want to continue to say that the movement in teaching is from the psychological to the logical, we should make it clear that we have reference to the movement from the *data* as brought out by the pupils to the *data* systematized, pupil participation again included. The movement is not from pupil participation to the imposition of logical system by the teacher.

Whichever of these two meanings is adopted, it is clear that

we have here, not two distinct methods, but two aspects of method. All good teaching implies movement from chaos to system in respect to the data, and it implies also pupil participation throughout. Teaching that centers primarily on subject-matter, bringing it out in logical form from the start and imposing this upon the pupils, may be said to be logical in a derogatory sense. By the same token teaching that leaves data in chaos, no matter how well the pupils may have participated in bringing them forth, may be called psychological in a derogatory sense. But for the sake of clearness and consistency, again, it is unfortunate to give both a good and a derogatory meaning to these valuable terms. The terms *illogical* for psychological in the fragmentary sense, and *ultralogical* or verbalistic for logical in the fragmentary sense would be better. The term *formal* is often used to designate teaching of the verbalistic type, but this is again unfortunate, for this term has also a positive and accepted meaning.

There is now no tendency in educational literature and discussion to sling mud at the term *psychological*, but there is such a tendency in respect to the term *logical*. This is largely owing to a lack of appreciation of the significance of the logical aspect in all learning and understanding. The psychological aspect has in recent years been given so much attention that it has almost totally eclipsed the logical aspect. This is not necessary, for there is room for both and both are necessary. This makes it desirable to keep the term *logical* in educational literature in a wholesome sense. All clear and lucid exposition must be strong on the logical side.

2. *The logical aspect.* All learning and teaching that involves knowledge must include logical systematization if it is not to be left incomplete. In the causes of the Revolutionary War, as we considered that topic a few pages back, this involved only sequential arrangement, but the organization of the means

of vitalizing teaching involved division into classes in addition to sequential arrangement. Other units involve still different modes of organization; in fact, all the modes that were discussed in the preceding chapter may appear. In an inductive problem, pertaining to the revelation of a cause in nature, there is neither grouping nor sequential arrangement. What we are after there is the discovery of a principle that will string all the instances that we have together. The discovery of the cause of condensation as worked out in Chapter IV illustrates the process. There we have also the psychological and the logical aspects present, but the processes of gathering the data and of systematizing them do not follow one another in time quite so much as they do in the two instances given in this chapter; they weave back and forth. An hypothesis may be suggested when but a few items of data have been given, and this hypothesis must then be tested. This testing is a systematizing process. If this hypothesis is rejected, then more data may be gathered until another hypothesis is forthcoming, and so on until the problem is solved. The data here are in chaos until we have found the organizing principle, and this at once relates them without any further ado with grouping or sequential arrangement.

The aspects and movement involved in solving a problem deductively are entirely similar to that of solving one inductively.

3. *Where the aspects and movement apply.* The movement from chaos to system in the mastery of subject-matter applies wherever genuine learning is taking place. It applies to subjects as a whole and to the interrelations of subjects no less than to the units that come up from day to day. Students should be led to see how the smaller units coalesce into larger units that may be called chapters or parts, and how these in turn make up a related whole that may be called a book or a

course. Finally, all the subjects may be brought into relation through the study of philosophy.

The relation of language and grammar illustrates the movement through a series of years. Language furnishes the data for grammar, which, in return, supplies the system. Before the third or fourth grade, attention is given exclusively and arbitrarily to correct language forms, but after that time grammatical rules and terminology begin to receive attention. They begin to be needed to give the children reasons for corrections and to furnish terms for communication between teacher and pupils in respect to language difficulties. By the time the junior high school is reached, the pupils have met most of the grammatical facts and rules, but these have been kept subordinate to expression and have been left relatively unorganized. The pupils are ripe now for the organization of this material through a systematic course in grammar. Coming as a capstone in the progress toward language mastery, in which it has functioned informally for a number of years, grammar may be made an interesting and meaningful subject.

The subject that forms the capstone to the system of knowledge, and, therefore, to a liberal education, is philosophy. The branches of this subject most directly concerned are metaphysics, logic, and, as now classified, ethics. Metaphysics inquires into the ultimate nature and relations of things, logic into the criteria of validity, and ethics into the problem of values from the standpoint of man. Abstract and far-reaching relationships are the basic concerns in each branch, but if these are to have a real integrating influence they cannot be dealt with abstractly; they must be fully and intimately related to the concrete affairs of life. When this is done, they reveal the meanings and values of all that has been studied before and of all that may be studied in the future.

4. *The point of departure in teaching.* We are sometimes

admonished not to teach subject-matter, but to teach children. What does this mean? Obviously it cannot mean that we should teach children without teaching them something, for that would be an absurdity.

We have here one of those paradoxical statements that, when interpreted literally, are meaningless, but that nevertheless have a profound meaning behind them. This one means that in teaching, the attention should be primarily on the mental growth of the learner and not on the unfoldment of the subject-matter, no matter how thrilling that may be to the teacher. Unless the pupil follows this unfoldment, unless it is thrilling to him, learning is not going on. It becomes the duty of the teacher, therefore, to see that the pupils are coming along, that they are assimilating and understanding, and to arrange his procedures so that the pupils will do these things.

The point of departure in teaching is not what the teacher knows, but what the pupils know. For an effective beginning the teacher must ascertain where the pupils now are educationally and then lead out from there. When the subject of biology is begun, the teacher must ask himself, What do these pupils now know about plants and animals? What contacts have they had with them? and, What are their present interests? A discussion of these questions will bring the teacher and the class together. This discussion need not be long, but for the sake of developing a coöperative attitude and a desire for information in the class, it should never be omitted. This phase of teaching corresponds to the preparation or setting discussed in preceding chapters and to what Morrison calls the period of exploration ('31, 255). Occasionally it may be written, in whole or in part, but the pupils should not be led to feel that they are facing a formal test. Their spontaneity and freedom are essential for bringing out what the teacher wants to know and the attitude that he wants to produce.

For the effective launching of a subject or a unit of work, it pays the teacher to lie in wait for, to seize upon, or to devise a timely and interesting mode of attack. In May, 1912, it was my good fortune to drop in on a sixth-grade class in geography that was just beginning the topic of latitude and longitude. The first question the teacher asked was, What happened out on the Atlantic Ocean last month? Everyone knew and everyone wanted to tell. The Titanic had struck an iceberg, had sunk, and 1595 people were lost. The details were quickly told, and then the teacher asked, Did the Titanic call for help? How? Everybody knew and some of the boys would have gone into all the details of wireless telegraphy had the teacher given them time, but what the teacher wanted to know next was, How could the Titanic let other ships know where she was? Ah! They hadn't thought of that, and they couldn't quite see how she could indicate her position on a vast expanse of ocean; there were no landmarks. It was now the teacher's turn. He asked, Suppose you were downtown in a certain store, a heavy rain came up, and you had brought neither umbrella nor raincoat and had to get home quickly, what would you do? Send for a taxi, was the reply. Where would you tell the taxi to come? The children gave the street intersection.

The teacher now told the children that on the earth there were, by agreement, lines similar to streets, except that they were imaginary, and that the ship's officers had instruments by which, with the aid of the sun and the stars, they could tell precisely where they were. From there the lesson on latitude and longitude proceeded swimmingly, and before the thirty-minute period was up, the pupils had solved a number of arithmetical problems in the field.

When I was a student in high school a case of trichina poisoning occurred in our community, causing death. The case attracted considerable attention and our teacher of physiology

seized upon the opportunity to give us an insight into trichina poisoning. My interest was aroused to the extent of going to a physician's office and looking the matter up in a medical book. The matter was so impressed on my mind that I have never forgotten it.

The point of departure in teaching is determined by the pupils' educational status plus current interests. Attacking data with the active participation of the pupils and moving to the data in system is synonymous with the direct attack in teaching.

EXERCISES

1. Point out the relation between this chapter and the one preceding.
2. What is the principle of apperception and how is it related to the topic of this chapter?
3. Dewey has characterized learning as the progressive reconstruction of experience. What does he mean?
4. May it be maintained that all order in knowledge is logical; that the psychological is the absence of order?
5. Point out that one can go either to the logical or the psychological extreme in teaching and that both are unfortunate.
6. One of Pestalozzi's aims was to psychologize education. What did he mean? What is meant by the statement that subject-matter should be psychologized?
7. Dewey says ('16, 256): "Logical order is not a form imposed upon what is known; it is the proper form of knowledge as perfected. To the non-expert, however, this perfected form is a stumbling-block." Why?
8. Point out that there are cycles in botany, in physics, in history, etc., similar to those in language-grammar. What is the relation of these cycles to elementary, secondary, and collegiate education? (See pages 170 and 249.)
9. "There is no such thing as sheer self-activity possible — because all activity takes place in a medium, in a situation, and with

reference to its conditions" (Dewey '02, 39). Harmonize with the statement that we should teach children, not subject-matter.

10. What do the expressions, *from the concrete to the abstract, from content to form,* and *from the empirical to the rational,* mean? How are they related to the topic of this chapter? What does the expression, *from the simple to the complex,* mean? Give examples.

11. "The psychological order is the order of experience, of discovery, and consequently of learning. The logical order is the order of arranging for subsequent use what has already been learned" (Kilpatrick '25, 302). Is the use necessarily "subsequent"? Is the logical order excluded from the learning order?

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CHAPTER IX
DEVELOPING APPRECIATION

1. *Appreciation and knowledge.* Appreciation has to do with our tastes, attitudes, prejudices, standards, and ideals; it is that aspect of our responses to situations that represents their value for us. A rose is not just a rose, it is an object of beauty; an act of banditry is not just an act, it is a crime.

Obviously this feeling aspect of our responses is very closely related to what we call knowledge. We must possess knowledge of the rose while we are enjoying it and we must know of the act of banditry while we are condemning it. Appreciation has a cognitive basis; it is, in fact, a quality of knowing. It does not stand alone, though it may vary independently in character and amount. One person may approve a certain act while another condemns it, and either the approval or condemnation of the same act may vary greatly in intensity with different persons.

This close relation of knowledge and appreciation connects the teaching of topics involving appreciation closely with the teaching of knowledge. In fact, the outlines that we have already developed apply here also. Appreciation goes with knowledge and knowledge must always be taught or learned as knowledge. A poem, a picture, and items of social, moral, and religious truths are, from the intellectual standpoint, instances of particular knowledge and must be mastered in accordance with our four-point outline; and generalizations in the esthetic and social fields must be acquired and used in accordance with our five-point outline just as is the case in other fields. In teaching topics involving appreciation, then, we must make use

of the procedures that we have already developed, but we must add to these a technique for bringing out the sense of value.

2. *Feeling response natural and spontaneous.* The response of feeling, on which the sense of value rests, is no less common and no less mysterious than the response of knowing. Situations impress the sensibilities no less than the senses. In some degree they do this every time. One is as untutored as the other. The sight of a rose or a sunset excites an organic response in the child from the time that he is able to take it in at all. Feeling responses require situations just as knowledge responses do. Neither can develop in a vacuum nor in the presence of words that have not yet acquired meaning. This is the first point to be borne in mind by the teacher when dealing with appreciation.

3. *The setting.* A situation to be appreciated must be in a setting that gives it significance. This forms no problem in the affairs of life. There the setting is furnished with the situation; the two, in fact, are one. The flower on the hillside, the stream in the valley, the laborer at his task, are each by nature in a setting that may stimulate a poetic response, but such settings are usually not furnished with the teaching situations that present themselves in the schoolroom. Here the creation of a setting often forms a difficult and delicate problem. To plunge children into the study of *Evangeline*, the *Recessional*, or *The Traveller* without first leading them to see what it is all about, what the background of the theme is, is like leading them blindfolded into an unknown room. It is likely to destroy rather than to develop literary appreciation. There is no atmosphere and the child is not in a position to create one. He has a right to as much knowledge of the circumstances that inspired the production as the writer himself had. Poets and painters, no matter what their themes, are inspired by situa-

tions, and if readers are to be inspired by their productions they must also have a knowledge of these situations.

In taking up the study of *Ivanhoe*, for example, several periods may be spent on the setting before the actual reading is begun. In this the pupils should participate. Such topics as the following may be assigned and reported in class: the crusades, orders of knights, tournaments, legends of Robin Hood, the life of Richard the Lion-Hearted, and medieval instruments of torture. Pupils like to do library work of this kind. After their reports have been given, the teacher can weave all of them together and give the class a vivid picture of the times.

For the reader who does not know the circumstances that surrounded the writing of Kipling's *Recessional*, the effect of the absence or presence of this knowledge may be readily exemplified. Let him first read the poem, printed below, without this knowledge. Let him then read the two paragraphs following the poem and return to a second reading of the poem in the light of this knowledge. Is there a difference?

Recessional

God of our fathers, known of old —
Lord of our far-flung battle-line,
Beneath whose awful hand we hold
Dominion over palm and pine —
Lord God of Hosts, be with us yet,
Lest we forget — lest we forget!

The tumult and the shouting dies —
The Captains and the Kings depart,
Still stands Thine ancient Sacrifice,
An humble and a contrite heart.
Lord God of Hosts, be with us yet,
Lest we forget — lest we forget!

Far-called, our navies melt away —
On dune and headland sinks the fire;
Lo! all our pomp of yesterday
Is one with Nineveh and Tyre!
Judge of the Nations, spare us yet,
Lest we forget — lest we forget.

If, drunk with right of power, we loose
Wild tongues that have not Thee in awe —
Such boasting as the Gentiles use,
Or lesser breeds, without the law —
Lord, God of Hosts, be with us yet,
Lest we forget — lest we forget.

For heathen heart that puts his trust
In reeking tube, and iron shard —
All valiant dust, that builds on dust,
And guarding calls not Thee to guard —
For frantic boast and foolish word,
Thy Mercy on thy People, Lord!
— Amen.

The occasion for the writing of the *Recessional* was a Jubilee in honor of Queen Victoria; she had completed the sixtieth year of her reign. This was no small occasion. It was marked by the gathering of princes from the East and of representatives from the royal houses of Europe. There were naval and military displays of great impressiveness and there were civic celebrations by processions, public services, and bonfires.

But why the *Recessional*, which signifies the close of the Jubilee? Thereby hangs a tale. It is told that the London *Times* had asked Kipling some time in advance for a poem on the Jubilee. This poem Kipling had promised to write and the intention was to publish it at the beginning of the Jubilee as a fitting introduction; it was to be a keynote. But Kipling found the task harder than he had anticipated; he could think

of nothing significant to write about and the matter is said to have troubled him greatly. The *Times* sent him a letter, but it brought no poem. The Jubilee was approaching, but a second letter brought no poem. Finally, when the Jubilee was at hand an urgent telegram was sent. Kipling now shut himself up in his room with a determination to stay there until a Jubilee poem had been written, although he had as yet no theme in mind. He sat down and searched through dozens of sketches that he had previously made and at last he came upon one line of three words that served as his inspiration. Around the words "Lest we forget" the *Recessional* was written. It now had to be published at the close, and not at the beginning, of the Jubilee. It is a prayer for the English people to come back to their senses.

The time to be devoted to developing a setting varies greatly with different topics. Tennyson's *The Brook* requires little time while the *Idylls of the King* require relatively much. Practically all persons, even children, have had experience with brooks and their enchantment, and all that may be necessary for the teacher to do when taking up this poem is to remind the children of the spirit of the woodland and flowing water; but in this day and age people have had no direct acquaintance with King Arthur and his court. This situation has little meaning until after knighthood, chivalry, and life in the Middle Ages are understood. The setting must be judiciously tempered to the topic in hand and this is the teacher's problem.

This matter of setting constitutes the heart of the question of giving daily lessons in morals — in honesty, kindliness, purity, and the like. Should we have a curriculum in this field as we have it in geography? Yes, *if* the lessons can be made vital, realistic, and gripping; no, *if* the lessons are likely to degenerate into a lifeless, perfunctory performance.

The chances of the second alternative materializing are far greater than that of the first. In geography we have content or objective situations to teach. England, Russia, China, and Japan and their people are realities; realities, furthermore, that are related to us, and the teacher should have little difficulty in making them meaningful; the situations are there; but this is not the case with such things as honesty, kindliness, and purity. These are abstractions which have meaning only in relation to social situations. When social situations involving them arise, it is easy enough to bring out their significance, but when the teacher has to follow a curriculum of moral topics, real situations are not likely to arise just as he needs them from day to day. If he is ingenious enough to gather or invent them, his difficulty will consist in giving them settings that will make them seem real. The genius or near genius may be able to accomplish all this, but for the vast majority of teachers daily lessons in this field are likely to become an intellectual procedure devoid of appreciation. This is not only futile but harmful. A perfunctory attitude is worse than none, for it has to be uprooted before a vital attitude can develop.

4. *The teacher's attitude.* Another factor to be taken into account in the development of appreciation is the attitude of the teacher. This is because the feelings of the teacher are to a large extent reflected in the pupils. A teacher who has a keen sense of literary appreciation has a great asset in favor of stimulating a similar appreciation in the minds of his pupils, although it should not be overlooked that the teacher may possess other characteristics, or that he may use a technique, that will nullify this advantage.

The writer of these lines is still handicapped by a dislike of the first two stanzas of *The Chambered Nautilus*, which he acquired in high school during the nineties. The teacher assumed an attitude of maudlin sentimentality toward the

poem, which aroused disgust in all the members of the class. In this spirit we spent a whole week in going over the first two stanzas. I dropped out of school for a year after that week, but the effect of that teaching is still with me. Whenever I attempt to read these two stanzas, I experience something akin to nausea. The remaining stanzas I can read with pleasure.

The production of an unfortunate attitude in pupils is not restricted to literature or to the esthetic subjects, but may occur in all subjects. The instances that I have collected indicate that it is of frequent occurrence. In general it is no doubt true that we owe a debt of gratitude to our teachers, but there are instances also in which we are entitled to claims for damages. There are too many cases in which the school destroys, rather than develops, literary, musical, or scientific appreciation. Children on entering school are usually fond of singing and poetry, but by the time they reach the middle and upper grades many of them hate these subjects. As school systems vary greatly in this respect, the hypothesis that interest in these subjects declines naturally cannot be substantiated. Furthermore, an inspection of the way in which singing and poetry are sometimes taught leaves no doubt of the cause.

The communication of feeling from person to person goes on by a route that is more direct than that found in the communication of knowledge. In the communication of knowledge a symbol, like a spoken or written word, is always involved as an intermediary, while in feeling the transmission is made directly through the quality of the voice, facial expression, bodily attitude, and the like. The route of the symbol is through the intellect where it is interpreted by associative processes, brief though this be, while the route of the stimulus to feeling is from sensory impression through the lower nerve centers to bodily

response, which, on the conscious side, is the feeling and the meaning.

A symbolic language has to be learned, but the language of feeling is untutored. A page of Russian means nothing to me, but the Russian child's cry of distress is as meaningful to me as that of an English child. Even the lower animals communicate meaning in this range. Dogs and many other animals will rush to one another's assistance in response to the cry of distress, and one member of a herd of cattle finds ready means in leading the rest of the herd to a newly found cabbage patch.

The attitude of the teacher toward the topic under consideration takes a place of importance in developing the proper feeling attitudes in the group. It is something that cannot be side-stepped. The righteous soul inspires righteousness no matter how commonplace may be his topic or how halting his words, while the words of the hypocrite, no matter how portentious his topic and how eloquent his speech, ring hollow and false. Pupils in school do not translate this judgment into words, but they are quick to catch the drift of the real spirit. The insincerity of his elders is, no doubt, in many cases, corrected by the pupil himself, but in others either a perfunctory or a harmful attitude may be developed. This may range all the way from a mere dislike of a poem or picture to a serious moral twist.

5. *Leave appreciation implicit.* Granted that the teacher's attitude is wholesome and that the proper setting has been created, it then appears to be the sound pedagogical procedure to let appreciation take care of itself. We recognize this when we say that a teacher should not moralize and that a speaker should not explain his jokes. Yet teachers frequently make mistakes in this regard. They ask children to describe or explain their feelings and to tell why they like this and why

they like that. One writer says: "Children should be trained to state the feelings which words and pictures excite."

If we are reading literature, this is just what children should not be trained to do. The reason for this is that the attempt to intellectualize appreciation dissipates it. A child may be vibrant with exalted feeling when reading Edward Rowland Sill's *Opportunity;* he may be understanding and enjoying the poem to the utmost; but the moment he is asked what the poem teaches, or how he likes it and why, all this is dissipated and he has in its place nothing but a flat intellectual conception. Doing this frequently gives appreciation no chance to develop and engenders an intellectual instead of an esthetic attitude toward literature. Appreciation is a delicate halo that is likely to break when handled. The teacher who knows when to stop is an artist.

Some years ago Mr. J. F. Gould of England gave demonstrations of the story or anecdote method of moral education in various schools of America. One of the topics I heard him treat was sacrificing one's self for others. He began by telling a Grecian myth that illustrated his point. He next took up incidents from history from ancient times to the present, ending with the heroic attempt of a British soldier in India to save the lives of some of his fellows from drowning. He saved his fellows, but his own life was lost. This incident had been reported in the press only the day before. In all he told seven anecdotes. The interest of his audience heightened at every step. When he was through, he did not stop to moralize and discuss. He shrugged one shoulder a little and sat down. Every member of the audience breathed a deep breath and for a while no one moved. He was an artist.

Another aspect of the intellectualization of the appreciation inherent in esthetic topics is the use of these topics for ulterior purposes. During the war it was the custom in some places to

"teach patriotism through literature," and one rather frequently hears it said that art should teach morals. From the standpoint of both sound pedagogy and sound esthetics these viewpoints are wrong. They may fairly be described as the prostitution of art. They err in getting the cart before the horse. The true artist, no matter what his field, does not start out to teach patriotism or morality; he aims to bring out the life significance of a situation. This situation may be one of patriotism, of heroism, or of unshakable integrity, but it may also be one of cruelty, of unfaithfulness, or of double-dealing. The artist has done his work when he has exhibited the situation so that it will arouse the attitude appropriate to it. This may be approval or disapproval. In taking up the production in the classroom, the teacher will have done his work when he has helped the students to understand and appreciate the production as it stands. For him to attempt to draw lessons in patriotism and good conduct out of it is an instance of moralizing which is deservedly in bad repute. It is almost sure to destroy the attitude that the production has produced, which was patriotic or moral to begin with. If the attitude was not wholesome, the production was at fault and should not have been taken up, although here there may be an opportunity for developing tolerance and fair consideration of different points of view. Not all the things that people with good intentions have disapproved have been wrong.

For the teacher to bring up for consideration situations similar to the one being studied is not to moralize. This may both increase and broaden the appreciation already developed. The essence of moralizing appears to lie in making explicit personal applications of the principle implied, which in its implicit state is inspiring. How should we, each of us, apply this principle to our own lives? How are you going to apply it? How is this going to make your life different? It is such

questions as these that lead to unwholesome sentimentality and that arouse disgust.

Just as the farmer helps nature — the soil, the rain, the sunshine — in producing crops, so the teacher helps subject-matter — art, science, philosophy — in the education of the student. Let him give the subject a chance.

To say that appreciation should not be intellectualized is very different from saying that the content of literature, art, music, and social-moral situations should not be studied. No topic can be fully appreciated until it is understood. Appreciation is an index of understanding, but this understanding applies to the situation, to the topic, and not the dissection of the appreciation itself. The plays of Shakespeare, the poetry of Browning, and the essays of Emerson become meaningful and enjoyable only after study, and often hard study. When rightly directed, this study does not interfere with appreciation; it enhances it.

6. *Content and form.* Rightly directed study in all content-ful subjects centers the attention of the learner on the content and brings in matters of form and technique only to the extent that these are needed to master the content. Teachers have been told from time immemorial not to dissect literary masterpieces from the standpoint of grammar and rhetoric, yet many of them keep right on doing it. They have their pupils analyze and parse and construe; they require them to ferret out the ramifications of the meanings of countless words in the dictionary; and they demand an explanation of every rhetorical device that the author has used. Often, no doubt, the author himself would be confounded if he chanced to visit a class studying his own selection. He would also be saddened, for it would seem to him that a thing that he had written for delight was being used as an implement of torture. As a means of destroying literary appreciation this analytic method appears

to be fully as potent as the assumption of the wrong attitude, if, indeed, the two are not aspects of the same thing.

The teachers of all subjects, especially the teachers of literature, art, and music, should remember that "the play's the thing." They are dealing with content first and foremost, not with technique, and this content makes its appeal primarily through its own significance. This appeal is no doubt enhanced by its artistic garb, but the function of this garb again is to bring into relief and make impressive the content. Art is the beautiful way of doing things. This is well exemplified in George Eliot's *Silas Marner*. This story seems so true, so lifelike, and unfolds so naturally that we forget all but the story. There are no jars or gaps to distract our attention from the content to the form. This is the innermost secret of art, to present something without being presented itself. The more artistic the teacher, the speaker, or the writer, the less he is in the minds of his hearers; their minds are fully absorbed in his theme. What a pity then to distract the attention of pupils from the content to the art when this is not necessary for the appreciation of the content.

There is, of course, a place in school for the study of the theory and technique of the arts, but this is not in the classes for literary, artistic, and musical appreciation; it is found in such subjects as grammar, rhetoric, literary criticism, and the theory of music and of painting. Here we may analyze, collate, and generalize to our heart's content for that is the function of these subjects. We are now in the field of science and not of esthetics, and it is the very nature of science to be analytical and critical. When the student is ready for it, the sciences of English, of art, and of music are just as interesting as the sciences of nature and for practical and certain cultural purposes just as useful. In such classes even the masterpieces may be brought in for analytical study, not only without harm,

but with benefits all around. Scientific study is now the student's center of interest; it is now "the play."

A basic principle, which holds in all fields, is for the teacher to approach his subject in the spirit in which it functions in life.

EXERCISES

1. It has been said that poetry should be read, not taught. Explain.
2. Granted that literature may be studied, to what should this study be directed?
3. How can we get teachers with the proper attitudes toward their subjects? Is this more a matter of training or of selection?
4. It is sometimes urged that the expression "art for art's sake" should be changed to "art for man's sake." What is the difference, if any?
5. Has the introduction of the classics of literature into the school furthered the reading of these classics out of school? If not, why not?
6. Does the study of the theory and technique of an art, such as music, enhance appreciation or does it interfere with it? Can you give reasons for your answer?
7. May the setting in which a picture is hung enhance its effect? How and why? Does the principle involved here hold for all art, music and literature for example?
8. In what grades or schools are students ready for grammar, rhetoric, literary criticism and the theory of music and art? How might this be scientifically determined?

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Strayer, G. D. *Brief Course in the Teaching Process*, 78–84.
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CHAPTER X

APPRECIATION IN LITERATURE, ART AND MUSIC

1. *Curriculum problems.* One of the foremost problems in developing appreciation in literature, art, and music is found in the selection of the material to be taught. We have been introducing difficult selections too soon. Our standard has been that of the adult rather than the child. Much of the material that we have attempted to teach is not yet within the range of children's interest and experience. As a consequence it seems hard and meaningless. Persisted in, this undoubtedly constitutes a large factor in developing a dislike for literary and musical selections.

Children between the ages of two and six are very fond of stories, poetry, pictures, and music, but they are also highly selective in their preferences. One child between two and four was exceedingly fond of "The Velocipede that Went by Itself" and "The Foolish Chauffeur" in Sara Cone Bryant's *Stories to Tell the Littlest Ones.* He insisted on having these stories read to him every evening for more than a year. He liked other stories also, but he was especially fond of these two. The basic reason, no doubt, was that he himself had a velocipede which he often rode, and he frequently went out in the family automobile. Both experiences he enjoyed greatly.

When about two and a half years old this same child received a picture postcard with a child in his nightgown going upstairs to bed. Ascending the stairs with him was a little dog. This picture was to him the greatest work of art that he had yet seen. He admired it without ceasing and he insisted

on having it pinned to the wall near his bed. His interest in it kept up for nearly two years.

These instances are mentioned because they embody the principle for the selection of curriculum material. We have already referred to this principle as the range of interest and experience of the child. When this principle is followed, wise teaching being granted, it appears to be true that the enjoyment that the pre-school child finds in stories, poetry, pictures, and music may be maintained in an expanding degree throughout his school life. That we are now often failing in this is only too evident. By the time the middle and upper grades are reached, poetry and singing especially are often cordially disliked by many children.

But we are not without hope for the future. In the selection of curriculum material in literature splendid work is being done in a number of places. Outstanding among these is Winnetka, Illinois, whence we have the *Winnetka Graded Book List.* This list was made with the coöperation of the school children themselves which must be looked upon as a basic, although not the only, ultimate authority. The revision of a list like that should be looked upon as a perpetual process. We need lists like this up through the eleventh or twelfth grades — i.e., up to the time adult interests become established, and even then we must make provision for wide individual variations. The beginnings of such lists are now found in a number of studies. (See, for example, Crow, '24, and exercise 1 at the close of the chapter.)

In the fields of pictures and music we need inductive studies similar to that which produced the Winnetka book list. We cannot hope to develop an unfolding appreciation without the proper material to work with as we go on up through the school system.

2. *Literary appreciation.* Literary products under all forms

of composition fall into the class of particular topics and so are taught in accordance with the four-point outline. Only occasionally is the teacher of literature called upon to develop generalizations and then he will usually do so informally by bringing out the characteristics of a period, of an author, or of a type of composition.

In literature, the original composition in printed form is before the class and if the selection falls within the range of experience of the pupils, the teacher should have little difficulty in leading the children to understand and enjoy it. It should be taken for granted that the teacher has a soul for literature and that he does not labor under the mistaken notion that the study of literature should be made hard, like mathematics, in order that its place in the curriculum may be educationally respectable.

The setting assumes especial significance, for it sounds the keynote for understanding and enjoyment. When, as in poems of nature, no setting in the historical or geographical sense is needed, it is the mood that must be looked out for. Reminiscences of the author in relation to the selection add much. They stand to the particular selection as the author's life stands to all of his works. A reading of an author's life is not a study of his works, but it is a soul-satisfying introduction thereto. Most people cannot read widely in an author, especially if his writings are good, without asking, "Who is the person who wrote this?" It is the outcropping of a natural personal interest. Our periodicals are recognizing this by printing brief sketches of their contributors. I usually read these first and then choose my selections according to the significance indicated.

But the knowledge of a writer's life and personality does more than satisfy inherent curiosity; it is often a genuine key to his productions. We recognize this when we say that all

literature is a confession. The author confesses his own ideals, values, and points of view. What a man writes from his heart is an expression of himself. It is for these reasons that the knowledge of an artist's life and of how he was led to the production of a particular selection is helpful in understanding his works, collectively and individually. This is true in all fields, in music and art as well as in literature.

For the beginner an introductory or outline view of the selection to be undertaken should be looked upon as indispensable for all but short selections. This is a point that the specialist frequently overlooks and even rejects. He no longer needs it and he therefore does not see how the beginner needs it. For him it may actually constitute an impediment and when it does his prejudice is likely to interfere seriously with his teaching. I knew a teacher of literature who, when undertaking a new play of Shakespeare with a class, would not tolerate his students to read Lamb's tale of that play. He assumed that this reading would take the edge off the enjoyment of Shakespeare's version, yet for the beginner quite the reverse is the case.

High-school students are helped in appreciating Tennyson's *Idylls of the King* by first reading the *Tales of King Arthur*. I have known a class of high-school students flounder about and become discouraged when reading Goldsmith's *Traveller* and *Deserted Village* merely because the instructor had not developed a setting and outline. They didn't know what it was all about until after they had dug through the poems the first time and by that time much harm had been done to their attitude.

3. *Teaching "Evangeline."* Recognizing that example is better than precept, we shall attempt to give the points brought out in this and the preceding chapter concrete embodiment by applying them to the teaching of *Evangeline*.

a. Setting and atmosphere. This poem should be read in close correlation with the history of the American colonies. If possible, it should be read while the history of Acadie is being studied. To read it earlier would be unwise, for it would be quite impossible to give it the proper setting. If it is read later, the minds of the pupils should be thoroughly refreshed on the historical incident. The region should be located on the map and the fact brought out that it was settled by the French and was originally a French colony. At the close of Queen Anne's War (1713) the colony was ceded to England and its name changed to Nova Scotia. Naturally the sympathy of the people, especially that of the leaders, remained with France. This became evident to the English authorities during the French and Indian wars, when the so-called "French Neutrals" secretly aided the French. To put an end to the trouble, it was decided to kidnap and deport the entire population. Accordingly the people were summoned to the churches, ostensibly to listen to a mandate from the Crown, were taken prisoners, hurried on board of English transports, and between six and seven thousand of them were carried off to be distributed among the colonies from Maine to Georgia.

The melancholy atmosphere of the poem is suggested by the sad side of the catastrophe. The Arcadians were a simple, home-loving people, and most of them cared for nothing more than to be allowed to live in peace, regardless of either French or English suzerainty. They were completely surprised. In their hurried banishment, friends, and even families were separated. The poem tells the story of a girl who was separated from her betrothed; her search for him throughout the vast extent of America then inhabited, often finding trace of him, only to end in disappointment; and their final sad meeting at his deathbed after both had grown old and gray. With this background the class will be ready to "List to the mournful tradition, still sung by the pines of the forest; List to the tale of Love in Acadie, home of the happy."

The manner in which Longfellow came to write *Evangeline* is also interesting and adds a human touch to the understanding of the poem. A friend of Nathaniel Hawthorne, the Reverend

H. L. Conolly, had been told by one of his parishioners, a French Canadian, the story of a young couple in Acadie very similar to that told by Longfellow. Mr. Conolly saw in it a fine theme for a romance, but for some reason Mr. Hawthorne was disinclined to undertake it. "If you really do not want this incident for a tale," said Mr. Longfellow to his friend, "let me have it for a poem."[1]

An outline knowledge of the poem or of the story is helpful to the beginner. It is needed from the standpoint of apperception. Without it the pupil is likely to lose the thread of the story, fail in interest, and become discouraged. For short selections such an outline may, of course, not be necessary; it may be obtained from the first reading.

With the salient features of the narrative in the minds of the pupils, the introduction and a portion of Part I may now be read to the class by the teacher. First impressions are so important that much is lost if the teacher is not at least an acceptable reader. At this stage a pupil cannot adequately take the teacher's place, no matter how good a reader he may be.

The reading must be suited to the selection. In *Evangeline* it should be slow, subdued, and sympathetic, and care should be taken to preserve the rhythm of the author. To "read as you talk" is no doubt often a helpful device with children, but it is not always applicable to poetry. Some poetry is more akin to music than to speech; it has both rhythm and melody that are large features of its charm.

The detailed work on a poem such as *Evangeline* should consist of quiet and sympathetic reading, all other work being made relative thereto. The meaning of unknown words and allusions should be gained in the main from the context. This method is usually sufficiently precise to get the import of the narrative; when it is not, the pupil should ask the teacher, some other person, or look the matter up in a book of reference. The

[1] *Longfellow's Complete Poetical Works*, Houghton Mifflin Company, Boston, 1893, page 70. This volume, edited by Horace E. Scudder, contains helpful introductory notes to all of Longfellow's major productions.

quickest method at hand should be used, for the reading should proceed with as little interruption as possible. To go into a lengthy study of words, grammatical and rhetorical analyses, criticism, and the writing of compositions is likely to kill the spirit and destroy the enjoyment.

It used to be the fashion to read a poem such as *Evangeline* aloud in class from beginning to end, even in high school. Happily our "discovery" of silent reading in school is curtailing this practice. There should no doubt be class conferences as the reading progresses and at these conferences choice selections may be read to the class by various members. After all have read the entire poem, the class should meet for a final conference in which the poem is brought together into a unified theme. Much freedom should be allowed the pupils in bringing out what they have enjoyed and what they think. It is especially important to leave the poem when appreciation is at a high pitch. When this is done the pupils will always feel toward the poem as they did when they left it and they will want to return to it often. The mistake that is often made now is to stay with a classical selection too long. It is read again and again, until all are heartily tired of it, and in that spirit it is left. Far better it is to leave it when the spirit is still fresh and then return to it occasionally when the occasion is fitting. Only in this way can we maintain our masterpieces of art, in all lines, as a perpetual source of inspiration and delight.

4. *Teaching Shakespeare.* A successful teacher of literature in high school, Anna Frances Ketcham, has given me the following account of her procedure in teaching Shakespeare:

> The first thing to do in the teaching of Shakespeare is to give the children a full description of London; of the manner of dress, of living, of work, of amusement of the people. A description of the theater, the lives of the theater folk, the audi-

ence, and of the way plays came to be written should come next. The pupils are fascinated by it. Then should come a narrative of Shakespeare's life, in which the human side of the man is brought out. Pupils have the queerest conceptions of him. Anecdotes about him and his contemporaries — red-headed Ben Jonson for example — should be given. Two or three days are valuably used in this way. As early as in the sophomore year, a brief, vivid sketch of the drama from its origin in ancient Greece down to the present should be given by the teacher.

Then for the play! Shakespeare's use of language is different from ours; therefore it is a good plan to outline the plot briefly before reading so that the pupils can follow more easily. Well-known quotations from the play may be brought up, so that they will be anticipated. The reading of the play is next; it should be read, every word of it, by the teacher in the most dramatic way possible, and with interpretations into modern usage, even slang, where effective. When properly read, the pupils beg the teacher to read more and more. Then they want a chance to imitate.

One of the memory passages which we require from the *Merchant of Venice* is Shylock's speech beginning: "Signior Antonio, many a time and oft in the Rialto —" Long after work on the play had been finished pupils would come up after school to ask if they might repeat it as they had heard it recited. Often, too, they wanted other of Shakespeare's plays to be recommended for home reading.

Merely to read this description makes one wish for the privilege of reading Shakespeare with this teacher.

Some teachers will question the wisdom of reading an entire play of Shakespeare to the class. Don't worry about the pupils not being given enough work to do; the questions are, Are they following? Are they understanding? and, Are they enjoying? The fact that they soon want to read themselves and that they come back for more is proof that they are doing all three. Poetry and the drama were historically not in-

tended for silent reading. The quality of the human voice adds much to their effectiveness and teachers do well to remember this in the classroom.

5. *Memorizing.* To what extent should poetical selections be memorized? This is an undecided question and perhaps always will be. What suits one does not suit another. There are many people, children as well as adults, who find *verbatim* memorizing very difficult and to them frequent or extensive assignments in this line are very likely injurious to literary appreciation; the dislike that they experience in this one connection leavens the entire lump. There are others, however, who revel in memorizing and reciting poetry. They learn it easily and enjoy repeating it. There is no reason apparent why the desires of each should not be satisfied. All need to know the multiplication table, for all use it in life, but there is no such need for the *verbatim* knowledge of poetry. It is an individual luxury and those who have no taste for it had better be encouraged to indulge in some luxury that they can enjoy. If they ever need a poetical quotation, they can look it up. That is what these would have to do, anyway, even though they had once known it by heart.

While recognizing that some children find the memorizing of poetry more difficult than others, it is nevertheless also true that this difficulty is often increased by poor teaching. Children all over the country are still continually bringing home from school difficult poems to memorize when they have almost no inkling of their meaning. This is inexcusable. It should not even be suggested that a poem be memorized until after it is thoroughly understood and enjoyed; until after it has been taught in class. To suggest it earlier is likely to arouse worries and inhibitions. When the suggestion is made afterward, the task seems relatively easy, for the work is already half-done. But even so, it is doubtful that the memorizing should ever be

set down as a requirement for all. When the right spirit prevails this is not necessary.

What holds for memorizing entire poems does not necessarily hold for learning short, classic quotations of a line or two. Gems of this nature are highly satisfying. They express attitudes for us in words that we could not equal and that have become a common heritage. To meet them in print is like meeting old friends and at once puts one in accord with the writer. Occasionally we can use them ourselves as expressing most fittingly what we have in mind at the moment. When properly used they are conducive to an air of culture and refinement.

There is no play of Shakespeare that does not contain one or more verbal gems that have become classic. Usually we point these out and suggest that our students learn them as we meet them in our reading. This is well, but an interesting variation is found in bringing them to the attention of students before the play is read. They are then met rather unexpectedly in the reading with a pleasant surprise. These gems stand well by themselves and a number may appropriately be brought in when the pupils are beginning their study of Shakespeare. The same principle, of course, holds for other authors.

6. *Study.* It was noted in the preceding chapter that appreciation has a cognitive basis. To the extent that this is true, study is in place. Every literary selection has a theme and this theme has to be understood if appreciation is to ensue, for appreciation is to a large extent our organic response to the meaning of the theme. Quite obviously, then, the theme or argument of a play, a poem, a novel, or an essay has to be understood, and this involves study, sometimes diligent study.

A cognitive relation comes into the esthetic subjects not only from the side of content, but also from the side of form. Here we have, in literature especially, vocabulary, grammar, and

rhetoric. It is in connection with the study of these aspects that teachers of literature often go astray. Word study, grammar, and rhetoric belong, not to the field of esthetics, but to the field of science, where they may be studied in their own right. In the field of literature they serve as means only and unless they are strictly subordinated to that function they are likely to offer serious interference with the development of literary enjoyment.

In confirmation of the position taken in the preceding paragraph, the reader is referred to Miss Coryell's study ('27) on a comparison of extensive and intensive methods of teaching literature. The classes taught by the extensive method read six times as much as the others, yet in all six tests on literature they did as well as the intensive-study classes. Although the extensive-reading method called for greater effort on the part of the students than the other, the students liked it better and they seemed to be finding in literature a deeper, wider, and more satisfying experience.

One secret of success in the teaching of any subject is found in the spirit in which the work is done. This should be similar to the spirit in which the subject is used in life. In literature we need the atmosphere of the library or the drawing-room. The furnishings of the ordinary classroom do not comport well with the spirit of the arts. Each art, in a measure each subject, needs its own appropriate setting. The sciences need the laboratory, art needs the studio, music the music-room, and literature the library with the comforts and attractions of the drawing-room. A person can habituate himself to read or study, paint or sing, under any circumstances, but he can do his best work when both the setting and the spirit are in keeping with his task.

7. *Art appreciation.* The problem of developing a knowledge and appreciation of the world's masterpieces in art is

pedagogically very similar to that of developing a knowledge and appreciation of the masterpieces in literature. A picture or statue, like a poem, has a theme which is the basis of its significance. The technique may be unique or skillful, but the theme is fundamental. This needs to be approached through a setting — historical, geographical, or biographical — for the artist must have had a motive. The introductory view, taken in the light of this setting, must be of the masterpiece as a whole, and this must be followed by such analyses and interpretations as may be relevant to the production and to the maturity of the learner. Finally all must be brought together again for the unified comprehension and enjoyment of the whole.

8. *Maturity of the learner.* The adult may find enjoyment and inspiration throughout the whole realm of art, appreciating the child's picture even more than the child himself, but the reverse is often far from true. The child's background of experience is still mainly in the future. He has as yet had no real participation in love, politics, and religion, and he has hopefully been shielded from most of man's inhumanity to man. This requires that the pictures for him to enjoy must be simple. Before the age of adolescence he sees little more than what is obvious in figure, color, and action. Art is to him still mainly a language of the senses and intellect. In the words of Hayward, children's "appreciation of art is predominantly intellectual, realistic, and dynamic." "They appreciate details and have little sense of unity; they appreciate color more than form and chiaroscuro; they attend little to the skill of the artist." ('15, 142 and 202.)

In the high school, however, especially in the upper years, genuine art appreciation begins to appear and here consistent efforts should be made to cultivate it. This should include instruction not only in pure or representative art, but also in applied art and in the esthetic aspects of all phases of the

environment. The main burden of the course in the history of painting and sculpture is naturally the development of an acquaintance with the world's masterpieces, but along with this acquaintance should come also a quickened response to the meanings and beauties of man and nature. Only by connecting art vitally with life, by teaching it so that life itself will be elevated and enriched thereby, can this subject make a place for itself in general education.

9. *Copies.* Because of the symbolic nature of print we can in literature have before the class the original productions, but this is not often the case in painting. Here we must content ourselves mainly with copies. These are now so readily and inexpensively available that for a small sum each member of the class may be supplied with a copy of nearly every picture studied. These copies are now usually worked up in scrapbook form so that the student has a full and permanent panorama of the course when he is through with it. Without copies or views of the originals there would be no basis for instruction; it would be like teaching *Miles Standish* without a copy of the poem.

10. *Practice.* The judge of any art must in some degree be a practitioner of that art. A person may like poetry by instinct, but not until after he has tried to compose a poem himself can he fully appreciate the task and genius of the poet. It is through attempting to produce something artistic ourselves that the works of the masters are more fully revealed to us. This implies that the student should have had some practical work in art. Our curriculum in drawing, painting, and modeling, both in the elementary school and the high school, finds here a large part of its justification. To gain the full benefit of this work, teachers should make an explicit attempt to bring the work of the pupils and of the masters together. One interprets the other.

11. *Critical discussions.* In the elementary school it is usually enough to let the children, with the guidance of the teacher, study pictures without the aid of the critics, but with high-school students and adults, reading in the field of art criticism may well be included. For them the critics can usually add much to the interpretation. A picture, while apparently all there before the eyes, often tells less of itself than does a poem; we may be greatly aided in seeing through the eyes and mind of another. This is exemplified by the following selections from Elbert Hubbard's interpretation of Leonardo da Vinci's "Mona Lisa":

> On the walls of the Louvre hangs the "Mona Lisa" of Leonardo da Vinci. This picture has been for four hundred years an exasperation and an inspiration to every portrait painter who has put brush to palette. Well does Walter Pater call it, "The Despair of Painters." The artist was over fifty years of age when he began the work, and he was four years in completing the task.
>
> Completing, did I say? Leonardo's dying regret was that he had not completed this picture. And yet he might say of it as Ruskin said of Turner's work, "By no conceivable stretch of the imagination can we say where this picture could be bettered or improved upon."
>
> We call "Mona Lisa" a portrait and we have been told how La Gioconda sat for the picture, and how the artist invented ways of amusing her, by stories, recitation, the luring strains of hidden lutes, and strange flowers and rare pictures brought in as surprises to animate and cheer.
>
> Away back in his youth, when Leonardo was a student with Verrocchio, he gave us glimpses of this same face. He showed this woman's mysterious smile in the Madonna, in St. Anne, Mary Magdalene, and the outlines of the features are suggested in the Christ and the St. John of the "Last Supper." But not until "La Gioconda" had posed for him did the consummate beauty and mysterious intellect of this ideal countenance find expression.

This woman is beautiful, just as all life is beautiful when we are in health. She has no quarrel with the world — she loves and is loved again. No vain longing fills her heart, no feverish unrest disturbs her dreams, for her no crouching fears haunt the passing hours — that ineffable smile which plays around her mouth says plainly that life is good. And yet the circles about the eyes and the drooping lids hint of world-weariness.

"La Gioconda" is infinitely wise, for she has lived. That supreme poise is possible only to one who knows.

And so this Lady of the Beautiful Hands stood to Leonardo as the embodiment of a perpetual life; moving in a constantly ascending scale, gathering wisdom, graciousness, love, even as he himself in this life met every experience half way and counted it joy, knowing that experience is the germ of power. Life writes its history upon the face, so that all those who have had a like experience read and understand. The human face is the masterpiece of God. (*Little Journeys*, X, 46–50.)

12. *Goals in public school music.* We have already had occasion to refer to the unequal achievements in the field of public school music. Some school systems are successful, but more are not. The reason for this appears to lie altogether in the teachers and supervisors, primarily the latter. The supervisors are getting their goals mixed. Many of them fail to distinguish between the production of technicians and the production of lovers of music, or they assume that the two are produced by the same procedures. They are placing the technical foot foremost and then they wonder why the pupils so often dislike music.

The department of music, especially in our larger cities, has a double task before it. It faces the task of developing a general knowledge and love of music for the many, and of developing professional skill in the few. Not long ago a superintendent of schools pointed out to me several members of a distinguished orchestra who had obtained all their musical education in the public schools. This is splendid. His schools

were entering into the vocational aspect of music. There is as much reason why children with a talent for music should be given an opportunity to develop this talent at public expense as why other children should be taught shorthand, typewriting, and printing at public expense.

13. *Music appreciation.* It is quite obvious that in the production of musicians the theoretical and technical aspects must occupy a conspicuous place, but it appears not to be so obvious that this place must be correspondingly inconspicuous when it comes to the production of lovers of music, that great class that is to consume and enjoy the achievements of the artists. What can we do to help the members of this class to their goal?

A. Rote singing. The first admonition is: *Let the children sing.* Let them sing the old familiar songs to their hearts' content and let them do it again and again. To the songs that express universal sentiments we like to return frequently. Witness *Annie Laurie* and the familiar *Gospel Hymns.* Let new songs be introduced through the ear instead of through the eye. After a song has been given its appropriate setting, let the tune be played on the piano, or let the teacher, with the aid, perhaps, of talented pupils, render the song before the class, and let the second rendering be done likewise. By the time the third rendering takes place, the children will want to take part. Let them. Let all who wish take part in the first verse, or let them join in the chorus, if there is one. If there are lame places, attack them separately. Run over the difficult places on the piano or let the teacher sing them slowly. The children will soon catch on by imitation. If the teacher has a soul for music and has the respect of the children, we need have no fear for the enjoyment of song.

B. Hearing good music. The second admonition is: *Let the children hear good music.* Let them hear it again and again.

Let them become acquainted with the masterpieces, or selections from them, so that they will be able to recognize them and hum the tunes. Many young people like jazz best partly because it is associated with the dance and jovial company, but partly also because they have had no adequate opportunity to become acquainted with anything else. Both have their place, especially with young people and those who remain young, and it is doubtful that one inherently displaces the enjoyment of the other.

Opportunities for hearing good music are now greatly facilitated by our mechanical devices; by player-pianos, piano-players, the phonograph, and the radio. Phonographs are now present in many schools. No harm is done by using these instruments occasionally for relaxation and amusement, but they should also be used for systematic work in musical education. Records especially prepared for this purpose are available and are being used effectively in many places. The principles to be followed when taking up single masterpieces or the works of a composer are the same as those that apply to literature and art.

So far music over the radio has been available chiefly in the evening, but the attempt is now being made to broadcast well-planned series of lessons on music appreciation during school hours. Each selection or each composer is being introduced by a brief educational lecture, which is followed by a competent rendering. We need here, no doubt, separate lessons for the primary grades, the upper grades, and the high school.

Agencies outside the school may frequently be drawn upon for assistance in school music. Local artists are nearly always pleased to be of assistance to children in school and in the larger communities a number of high-grade concerts, operas, and musical festivals are usually available during the year. Teachers of music are making use of these just as teachers of

English are making use of the theater in connection with Shakespeare.

C. Musical composition. Third, give the children an opportunity to *devise tunes of their own.* Let them set to music their favorite verses or bits of poetry. Let them write a school song and set that to music. They may surprise you. Children like to be creative, and some teachers have achieved significant results in this direction.

D. Musical theory. What about the theory or "grammar" of music — the staff, clefs, notes, sharps, flats, keys, and all the symbols for time and quality? The relationship here is the same as the relation of language and grammar in foreign languages and the relation of content and theory in all other subjects. The work should proceed from the contentful standpoint until the children themselves begin to feel the need for the theory and symbols. When they do they will ask for them, which may be taken as a safe indication of their ripeness for teaching.

Ultimately we should no doubt arrive at a more specific curriculum arrangement, but in music this will always have to be guarded against formalism. What is needed is an extensive experiment carried on in a number of school systems to determine at what stages the various items of the "grammar" of music may be most helpfully introduced. The principle underlying such an experiment was suggested to me some years ago by a class of sixth-grade children whom I was trying to induct into the mysteries of German by the direct method. The work was undertaken experimentally, primarily for my own enlightenment, and my theory was that during the whole of the first year the subject of grammar was not even to be mentioned. But we had not been at it more than six weeks when one of the girls asked, "Why do the Germans say *der* sometimes, *die* sometimes, and *das* sometimes? In English we

always say *the.*" Obviously she was ready to profit by a little instruction in grammar. After making the entire class aware of the problem, I gave this instruction. Thereafter points in grammar were raised spontaneously about once a week and before the year was up I had incidentally taught a considerable amount of grammar. The same thing would no doubt be found true in music. We couldn't expose children to the staff, notes of various shapes and complexions, sharps and flats, from day to day without having them become curious about them. They would want to know what these symbols meant, and when they did they should certainly be told.

What is the order in which children do request these interpretations? What knowledge of musical symbols is actually needed as the contentful study of music proceeds? These questions, so far as I know, have not been answered. They can be satisfactorily answered only after several groups of teachers and supervisors of music have gathered data inductively in the schoolroom. Meanwhile teachers can proceed with entire safety by letting the children revel in music first, and by bringing in the theory only when this is genuinely helpful toward the main end in view — the understanding and enjoyment of music.

By this informal (not incidental) method the children would have learned a conspicuous amount of musical theory by the time they had reached the upper grades and they would have learned it vitally. Somewhere in the junior or senior high school they would be ready for a systematic course in musical theory, just as they now become ready for a systematic course in grammar about the tenth or eleventh grade. Most, if not all, people are so constituted that they desire a logical arrangement of their knowledge after the particular items have been gathered and are understood.

14. *Work in the high school.* A course in musical theory

should be planned for those who have manifested some musical talent and should be left elective. It should be looked upon as introductory to the more systematic courses in music appreciation, to the more specialized courses in harmony, composition, form, and history, and to work in glee and instrumental clubs, that may now be undertaken. Pupils who have taken music lessons outside of school are now usually quite well prepared for these more advanced activities, but as yet pupils who have had only public school music, even through the eighth and ninth grades, are in the main rather poorly prepared. This means two things: (1) lost opportunities for advanced work, and (2) the restriction of high-school music largely to chorus work and sight singing. The latter, however, should be continued, anyway, in the high school even after the pupils come better prepared from the elementary and junior high school. It should form one of the outlets of music for all.

15. *Community relationships.* The musical work in the schools should be looked upon as the fountain head that will stimulate and replenish the musical life of the community. An example of what is possible in this connection is furnished by the city of Richmond, Indiana, as described by Bobbitt in the *Elementary School Teacher* for November, 1911.

The high-school auditorium is the musical center of the city. It is the meeting-place of four musical bodies: (1) the People's Symphony Orchestra, which meets in this auditorium for four hours' rehearsal and public concert every Sunday afternoon from October until May; (2) the People's Chorus, consisting of some two hundred and fifty voices, which meets regularly one evening a week through the year; (3) the High-School Chorus; (4) the High-School Orchestra, which furnishes the music for the school assembly meetings and for other social gatherings.

The Symphony Orchestra is a local organization containing

all the instruments of the usual well-developed symphony orchestra. Thirty-five of its members are also members of the High-School Orchestra, or are recent graduates of the high school. The larger city orchestra grew out of the High-School Orchestra which still continues to be its nucleus. The feeder for the high-school body of players is the junior high-school orchestra consisting of seventh and eighth grade students.

The high school is not only the community center for music, but also for pictorial art. Three large rooms on the top floor are set apart as the city's art museum.

EXERCISE

1. On the basis of being (1) interesting, (2) inspiring, (3) artistic, (4) permanently valuable, and (5) comprehensible, as judged by high-school seniors, Crow ('24) has arranged seventy-four classics usually read in high school in the following order. Is this the order of appeal that these classics would have for the educated adult? If not, why?

1. Story of the Other Wise Man
2. Story of My Life
3. Little Women
4. The Honorable Peter Stirling
5. Freckles
6. The Crisis
7. Evangeline
8. Ben-Hur
9. The Man Without a Country
10. The Virginian
11. The Bluebird
12. The Call of the Wild
13. The Little Minister
14. A Tale of Two Cities
15. Silas Marner
16. Daddy Long Legs
17. Enoch Arden
18. Jane Eyre
19. Excelsior
20. David Copperfield
21. O Captain
22. The Mill on the Floss
23. Burns's Poems
24. The Courtship of Miles Standish
25. The Lady of the Lake
26. Idylls of the King
27. Ivanhoe
28. A Dog of Flanders
29. The Jungle Books
30. The Merchant of Venice
31. The Vision of Sir Launfal
32. Columbus
33. The Princess
34. Thanatopsis
35. Tales from Shakespeare

36. Lorna Doone
37. The Golden Treasury
38. Poe's Tales and Poems
39. The Chambered Nautilus
40. Macbeth
41. The Gentleman from Indiana
42. Hamlet
43. Snow-Bound
44. The Vicar of Wakefield
45. Franklin's Autobiography
46. Sesame and Lilies
47. As You Like It
48. Bunker Hill Oration
49. The Last of the Mohicans
50. Elegy in a Country Churchyard
51. The Ancient Mariner
52. To a Skylark
53. Julius Cæsar
54. Sohrab and Rustum
55. The Prisoner of Chillon
56. Black Beauty
57. The King of the Golden River
58. Lines to a Waterfowl
59. L'Allegro
60. A Midsummer Night's Dream
61. The House of Seven Gables
62. Emerson's Essays
63. Henry Esmond
64. The Deserted Village
65. Il Penseroso
66. Dr. Jekyll and Mr. Hyde
67. The Iliad
68. Burke's Speech on Conciliation
69. Twice-Told Tales
70. Rip Van Winkle
71. The Odyssey
72. Sir Roger De Coverley Papers
73. Macaulay's Life of Johnson
74. Chaucer's Prologue

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CHAPTER XI

SOCIAL–MORAL EDUCATION

1. *Meaning of terms.* The terms *social* and *moral* in such expressions as social education and moral education are not synonymous but complementary. Social is objective in reference, while moral is subjective. One refers to the acquisition of information about our institutions and social relationships; the other to the modification of the attitude or disposition of the individual.

A person is socially educated to the extent that he understands how the other people and nations of the earth are living and how they are interdependent; to the extent that he understands why governments are instituted among men and what the essentials of government are; to the extent that he has a sympathetic, yet critical, insight into our economic and social institutions and processes; to the extent that he sees our institutions in their historical perspective; and to the extent that he understands that all of our institutions and endeavors exist for the more complete attainment of human values and that the rules of conduct are inherently the rules of social living.

Moral education, or, perhaps better, moral training, on the other hand, has reference to the development of the inner attitudes that the matured individual holds toward the personal and institutional situations that he faces from day to day. The question now is not, What does he know? or, How skillful is he? but, Is he dependable? Does he need watching? Is he kind and helpful? Will he take advantage of another's ignorance? Is he truly his brother's keeper, or is he a wolf, in sheep's clothing, perhaps?

Social and moral education are really two halves of one

whole, for the fully developed personality must have both social insight and moral attitude. Social insight without moral attitude is untrustworthy, while moral attitude without social insight is fanaticism. The two may not, and sometimes do not, develop together, but they should, and to bring about this hand-in-hand development is one of the basic problems of character education. The hyphenated term *social-moral education* well indicates the dual nature of the problem involved.

2. *Opportunities.* It has been said that the demands of intellectual education leave neither time nor opportunity for moral education. This position rests on the assumption that education means erudition and that to act justly and love mercy have little to do with knowledge. Educational theory has never accepted this position and the present trend is especially strong against it. The head and the heart not only can, but in sound education must, join hands. An opportunity for intellectual education is, as a rule, also an opportunity for social-moral education. This means that the learner, along with his knowledge, should get also a conception of the social import of that knowledge.

When it is granted that intellectual education and moral education are not mutually exclusive but complementary, it becomes evident that the school has all the opportunities for social-moral education that it needs. These opportunities are found: (1) in the subject-matter of instruction, (2) in classroom procedures, (3) in the spirit of the school, (4) in class management, and (5) in playground and extra-curriculum activities. These present situations in which and toward which responses involving attitude must continually be made and offer ample opportunity for the teacher to assist in the development of wholesome standards and ideals. It is a grave mistake to overlook these opportunities which are perpetually at hand and to assume that moral education must wait for something

striking and exceptional, for special means and devices, or for a field course in slumming.

3. *The social studies.* The studies that are most obviously social in their import are the social studies. These include human geography, history, civics, economics, sociology, international law, and ethics. The teacher who sees in these subjects merely a system of abstract facts and principles misses the real point at issue. Knowledge is indeed involved in these subjects, but this knowledge receives its meaning from the human relationships that it elucidates, and until these relationships are appreciated only the surface has been scratched. This is much less a matter of time than of emphasis. It is primarily a matter of teaching efficiency. The teacher who sees the human import of geography or history requires no more time to bring this import home to the children, along with the needed knowledge, than another teacher requires to drill in a lot of abstract facts and principles.

Human geography is the study of the relations of man to his environment and of man to man. The unit is not the individual man, but the people of a race, of a nation, or of a region. As civilization progresses, these groups are becoming more and more interdependent. They may exist as warring enemies or as friendly neighbors. To live as neighbors they must become personally acquainted and they must understand each other's customs, desires, needs, and resources. When this is the case they may dislike and suspect one another still more, but the chances are better that they will then respect one another and desire to be mutually helpful, as good neighbors living door to door.

To bring this desirable condition about, peoples need no doubt to intermingle through travel, to read each other's literature, and to sing each other's songs, but geographical knowledge is also an indispensable factor; it is the foundation

for all the rest. It gives the people a habitation and a name. A knowledge of social, industrial, and political institutions is also involved, but knowledge in the intellectual sense is in no case enough. The social feelings must be enlisted as well and the learning product must culminate in a genuine social adaptation. The basic means thereto is for the teacher to have this adaptation and insight himself. Then if he has teaching sense he will have little difficulty in leading others to the same goal.

This principle of uniting insight and attitude is not new, but it is so fundamental that it needs to be emphasized for each generation of teachers. Socrates had the principle in mind when he identified knowledge and virtue. Knowledge to Socrates meant approximately what wisdom means to us. A person who knows that stealing is wrong and still takes another's property is ignorant. He knows little more than that stealing is forbidden. The humane and economic significance of stealing he does not realize; probably is not competent to realize.

Herbart also had the union of insight and feeling in mind when he stated the purpose of education to be *virtue*. "Virtue," he said, "is the idea of inner freedom which has developed into an abiding actuality in an individual. Whence, as inner freedom is a relation between insight and volition, a double task is at once set before the teacher. It becomes his task to make actual each of these factors separately, in order that later a permanent relationship may result. But even here at the outset we need to bear in mind the identity of morality with the effort put forth to realize the permanent actuality of the harmony between insight and volition" ('45, 7). This passage is well worth careful reading. Socrates and Herbart were not far apart in their conceptions.

4. *Curriculum reconstruction.* We have been teaching geog-

raphy, history, civics, and economics for many years in our high schools, but lately there has appeared a tendency to displace these titles by such titles as community civics, vocational civics, problems of democracy, survey of civilization, and the evolution of society. This is a fad which may soon be displaced by another, but it will be a misfortune if it does not leave a contribution in its wake. The fad is a protest against formalism and lesson-learning in the teaching of the social studies. The new formulations are getting back to actualities, human relationships, and human values. Social facts and relationships are being made meaningful. They are being realigned into units that interpret social processes and social changes. Knowledge is used, not as something to be learned, but as something that furnishes a basis for understanding human affairs.

There is an element of danger involved here and that is the disparagement of knowledge altogether. Just because knowledge is a means rather than the end does not imply that knowledge is relatively needless and that it may be largely dispensed with. To do so is to jump from the frying-pan into the fire. To understand the transition from medieval autocracy to present-day democracy is to understand a movement in history, but this understanding would be an unsubstantial shadow without a knowledge of many historical facts and events. The knowledge of these facts and events, arbitrarily acquired, might, in the fertile mind, engender an understanding of their significance, but a bare statement of the conclusions could in no way engender the facts that are necessary to give these conclusions meaning.

While the movement toward the reconstruction of the social studies is a protest against formalism in teaching, it is also an expression of a newly recognized principle of curriculum organization. This principle has to do with the nature of a

secondary-school subject as distinguished from a college subject. The approach in the high-school cycle of a study needs to be quite different from the approach in the college cycle. It is the function of an introductory course to lay a foundation for understanding. This means that the approach must be concrete and experiential. Such an approach is being realized in general science, where aspects of the environment instead of particular sciences are being studied. The basic method is outdoor observation and field experience, all with the purpose of understanding a specific unit of the environment as related to man. The approach in community civics and elementary economics may be entirely similar. In history the issues need to be made very concrete. The imagination must displace actual observation, but this may be stimulated by pictures of historical remains, by copies of documents, by first-hand accounts, and by vivid descriptions.

Only after issues and problems in a field have been studied in a concrete, experiential manner may chronology, system, and far-reaching generalizations find a meaningful place. Until that time they are mere abstractions. The matter is a relative one, to be sure; neither side can ever be entirely omitted; yet we have here the basic distinction between high school and college.

What we have been doing is to slur over, or to omit altogether, the secondary cycle of instruction, and to teach history, civics, and geography, as well as the natural sciences, in the junior and senior high schools as they are taught in college. The new courses in the social studies are the expression of an attempt to formulate the subject-matter and the approach in this field from the secondary-school angle. When this has been achieved, it should become easier to include both knowledge and appreciation in our teaching and to attain the goal of intelligent social adaptation, which is the avowed goal

in the teaching of the social studies, especially in the high school. In the college and university abstract considerations have a larger place.

5. *The esthetic subjects.* The theme of the fine arts is largely social, and people have gone to them for inspiration, as well as for rest and recreation, throughout the ages. In the novel, in the drama, in poetry, in the essay, in biography, and in the historical narrative, the world's literary artists have dealt with the moving problems, values, and ideals of life in ways that make this field a veritable treasury of elevating influences. The state, the church, the home, and nature; love, adventure, patriotism, politics, crime, and reform all have been treated so as to reveal their humanitarian aspects and so as to make their appeal effective. Books have influenced the course of history and we have an abundance of evidence that they have similarly influenced individuals. The writings of Rousseau hastened and guided the French Revolution, John Stuart Mill gained his mental compass from reading Dumont's *Traité de Législation*, and Benjamin Franklin had his philanthropic conscience aroused by Cotton Mather's *Essays to Do Good*. What literature has done before it may be expected to do again.

The themes of painters and sculptors are also frequently social and exert an appeal similar to that of literature. Raphael's "Sistine Madonna" glorifies, even deifies, the office of motherhood, Millet's "Gleaners" depicts the life of the lowly, and Willard's "The Spirit of '76" fairly stimulates the spectator to march along.

Music appeals less to the intellect, but in the field of emotion it is unique in stimulating social unity and *esprit de corps*. When Luther said, "Let me write the people's songs and I care not who makes their laws," he expressed in striking phrase the socializing influence of music.

The principles underlying the teaching of the esthetic subjects are discussed in Chapter IX. We may supplement what is said there by pointing out that care must be taken to keep the appreciation of the theme, and not social goodness, in the foreground; that is, we should not go out of our way to moralize. The artist's theme may be life, but it is seldom morality or goodness in the narrow sense. Social insight and wholesome attitude may come effectively as by-products, but to aim for them directly when they are not the central theme is likely to dissipate both the esthetic and the social effects; that is, in esthetic subjects we must attack directly the theme depicted by the artist, taking everything else for granted. The expressions "Art for art's sake," and "Art for man's sake," need in no way be antagonistic.

6. *The natural sciences.* The subject-matter of the natural sciences is impersonal in character, but we use it for the realization of personal and social ends. Life would be very different without the appliances and conveniences derived from physics and chemistry, and these sciences also underlie the processes of our commercial and industrial life. To understand this life from the ground up, one must understand at least the elements of these sciences. The social problems met in mining, in manufacturing, and in transportation are all illuminated by a knowledge of physics, chemistry, and biology. Before the applications of these sciences, these problems either did not exist or were very different.

The biological sciences, enlightening the conditions and processes of living organisms as they do, are even more intimately related to social attitude and insight than the physical sciences. Hygiene, sanitation, and the quarantine rest in large part on our knowledge of small organisms, and persons who are innocent of this knowledge are not equipped to coöperate intelligently with the health and sanitary measures promul-

gated for their own and others' good. Not infrequently these people are antagonistic and interfere rather than assist. The presence or absence of a knowledge of eugenics during the next hundred years will have a profound bearing on the success or failure of our Teutonic civilization. This knowledge will have to be observed to become effective, but people cannot observe it unless they have it. This knowledge has its trunk and branches in sociology, but it has its roots in biology.

There is another realm, more subtle and more inclusive than those just mentioned, in which the sciences are contributing to the temper and harmony of life. The sciences are contributing a basis for a common metaphysics, a common theology, and a common philosophy of life. The advance of tolerance and the spread of the spirit of democracy are furthered by the growth and dissemination of scientific insight more than by any other one thing. Other factors are also needed, but these can make little headway without the highways built by science. Religious conceptions have demonstrated that they can bring individuals together into groups, but to bring these groups together the universal conceptions of science are needed.

The admonition, "Come, let us reason together," is possible of attainment only when we have premises to which all are compelled to give voluntary consent. The verifiable facts and principles of the sciences, social as well as natural, supply these premises. These sciences bring the minds of men together. Disagreement is a sign for either a more thoroughgoing examination of the facts now available, or further investigation. Once bed rock has been reached, there can be no further dispute among competent minds. Practically everything found in high-school textbooks of science has progressed beyond the realm of dispute.

Customs may differ, but basic understandings are coming together the world over. The facilities for travel and for

communication, offspring of the sciences, are no doubt a great aid in this, but without the common understanding furnished by the sciences little penetrating headway could be made. The latter-day prophets are such men as Copernicus, Newton, Darwin, and Einstein. Men of this type have no axe to grind; they are interested only in revealing facts and their meaning, having faith that the truths revealed will gradually filter into the minds of men and bring them together into a common understanding, a common aspiration and a common brotherhood.

7. *Classroom procedures.* Methods of instruction are more and more furnishing opportunities for social training. Current books on teaching are largely expositions of coöperative procedures in teaching. Class clubs, class discussions, dramatization, projects, activity programs, and socialized recitations are all joint enterprises that involve social adaptation in practice. Classroom work is a coöperative enterprise in learning. This furnishes an abundance of opportunity for the expression and development of social attitudes. The child that monopolizes the time, that wants all the best rôles for himself, or that is domineering, may be both enlightened and impressed by the teacher, but he may learn most effectively from the reactions of the other pupils toward him. The shy and backward, on the other hand, may be encouraged and opportunities for participation may be made for them.

The entire routine of the school is a wholesome discipline in social living. To be in one's seat by nine o'clock five mornings of the week, to prepare work regularly day after day, to listen courteously while another is reciting, to move harmoniously and quietly with one's class, to consider the rights of others while getting a book or leaving the room, all involve the development of habits and attitudes that minister to harmony and efficiency in every walk of life.

8. *The school spirit.* It has been said that the foremost opportunity for the development of personality in the school is found in the spirit and atmosphere of the school as an institution. The wholesome mental development of children requires an atmosphere that is closely akin to that of the ideal home. The ideal school is a place where the life of courtesy, of refinement, of integrity, and of mutual happiness is being lived. To realize such a school we would no doubt need: (1) an ideal principal, (2) an ideal corps of teachers, (3) an ideal body of students, (4) an ideal school building, located (5) in an ideal spot. The order of enumeration is intentional.

The primary factor that sets the spirit of the school is the personality and spirit of the principal. Go to any school at recess time, note the children on the playground, observe how they pass in and out of the building, talk casually with one or two of the teachers, and you will need no introduction to the principal. His personality, his philosophy of life, and his theory of management are everywhere manifest. If his personality elicits respect, if he is courteous and sincere, if he has faith in human nature, if he knows the difference between buoyancy of spirit and malicious intent, you will find spontaneity, freedom, and consideration. If he lacks faith in himself, faith in his teachers, and faith in his pupils, you will find suspicion, slyness, and restraint.

Granted the truth of this only by half and it follows that the principal (or superintendent or president or director) must be selected with superlative care. Breadth of education and a mastery of professional techniques are not ruled out; they are indispensable; but without the vivifying influence of a wholesome personality they are of little avail. For their best efforts teachers and pupils alike require a chief who is in himself a buoyant force.

It is not to be expected that the spirit and philosophy of

the principal will work itself out to the teachers and pupils altogether spontaneously. His spirit will be caught, it is true, but that is only a beginning. Along with it the principal must develop an understanding of the school as an institution with specific goals to achieve. In doing this he will be primarily a leader. He will work with the teachers at staff meetings, and occasionally with the pupils at assembly exercises. The pupils will be reached in the main through their teachers. All will place in the foreground the institution, its purposes, and its needs, rather than the desires or dicta of any individual. This will lead to social-mindedness which is inherently out of harmony with social transgression.

What the principal is to the school as a whole, the teacher is to his classroom. Within the regulations set by the staff and by other official sources, the teacher has a wide range of opportunity for developing a wholesome spirit. Granted a normal group of children, problems of discipline disappear to the extent that the teacher knows his subject-matter, is a master of vital teaching procedures, and elicits confidence and respect. All three are necessary for a balanced success. Through the training school and private study the teacher can gain a mastery over subject-matter and teaching procedures, but these can do little toward shaping his personality. Here, as with the principal, selection is the method. To inflict a teacher with a problem personality on a group of children is an inexcusable act of professional inefficiency or cowardice. Such a teacher warps the health and personalities of the children and creates a situation of perpetual unhappiness for himself. Transfer to another calling is the only solution, both for himself and for the children.

Apparently because of narrowness of vision, some teachers fail to see the school as an institution. Instead, they see only personal relations. A breach of discipline they take as a

personal affront. When a pupil whispers or when he misbehaves at assembly, he is accused of discourtesy toward the teacher. That places both teacher and pupil in a false light. It shifts the attention from group relationships to personalities. Personal relationships between individual pupils and the teacher have a place in school, but not when the affairs of the school as a unit are concerned. The wise teacher schools himself never to take offense or be shocked, no matter what happens.

The injury in misconduct is not to the teacher, but to the school. The pupil who is needlessly noisy is interfering with the rights of others to pursue their tasks to advantage, and unless he is led to appreciate this he is not being guided toward a proper social sensitiveness. Many adults, teachers included, are sadly lacking in this regard, as their conduct at lectures, in the theater, in libraries, and at other assemblies amply demonstrates. Their acts are usually attributed to thoughtlessness, but they are more likely the consequence of ill-breeding. Their parents and their teachers have failed to awaken in them a sensitiveness to the comfort of others, a sensitiveness of which they may be assumed to be capable.

The statement is frequently made that the teacher should be a model in conduct for his pupils. This is true if it is interpreted to mean that the teacher should be a person of refinement, culture, and uprightness whose conduct commands respect, but it is false when it is interpreted to mean that the teacher should be conscious of himself as a model and that he must think of himself as a tin god. Appointment officers have need to be conscious of these things, but for them to occupy a large place in the mind of the teacher is the essence of hypocrisy. Unless the teacher can throw himself into his task, forgetful of himself but mindful of his work, eliciting at the same time the esteem of both children and parents, he is in the wrong occupation.

Granted this basic conception, the teacher should by all means be aware of the fact that the actions of adults, especially of teachers, serve either consciously or unconsciously as examples for children. The teacher's manner of dress, his refinement and dignity of conduct, his considerateness, the modulation of his voice, his use of English, and the neatness of his desk, all form influential aspects in the children's environment. The cultivation of these traits does not interfere with sincerity of personality and should be duly attended to. These traits should be given overt attention in the training school so that they may be largely established when the teacher takes his place in the classroom. Many, of course, bring them well established from their homes.

9. *Class management.* The primary function of school government is the creation of a condition in which the work of the school may proceed. The teacher is rightly held responsible for the discipline of the school. If the children run riot, if they are noisy, disorderly, and disrespectful, he is judged a failure. This judgment is inevitable because the reasons for which the school exists are not being realized.

The reality of the problem of order gives rise to an exceptional opportunity for social and moral training. The teacher who is a martinet and who does all the school housekeeping himself may have a quiet and orderly school, but he is missing an educational opportunity. Another teacher who succeeds in enlisting the coöperation of the pupils in school housekeeping, and who leads them to feel that orderliness and seriousness of purpose are primarily their own responsibility, may have equally good conditions for work and he is at the same time developing initiative, self-control, and respect for the rights of others.

In graded schools the sweeping of the floors, the cleaning of the blackboards and erasers, and most of the dusting are

rightly done by the janitor, but in one- and two-room schools, where this work falls to the teacher, the coöperation of the older pupils may well be enlisted. In all schools, however, responsibility for the passing of wraps, pens, pencils, and papers; for keeping temperature and attendance records; for attending to shades, flowers, and window boxes, and for keeping the room tidy, may be placed largely upon the pupils. Some teachers manage this by assigning committees of two to each responsibility and changing these committees every week or two. Children look upon these duties as privileges. They become partners with the teacher in the management of the school and their personalities correspondingly unfold.

The fact that these opportunities are educative in influence indicates that they should not be distributed as rewards for scholarship or good behavior, but should be assigned in rotation to all alike. The pupil who falls down on his job may be awakened by excluding him for a time, but to exclude him from all participation in the future is to deny him the very opportunity that he needs. Many a child who has been antagonistic has had his attitude changed by trusting him with a regularly recurring responsibility. While avoiding sentimentality, the teacher should not forget that children, like adults, appreciate a word of commendation when they have done well. When they have not done so well, silence is usually better than reproach. Encouragement may be needed.

The practice of giving the pupils a share in the government of the school is now widely accepted and a consequent improvement in attitude is manifest. When children have a share in determining rules and regulations and in carrying them out, they begin to see the problem of order from a new angle. They are no longer merely obeying somebody, but are either true or false to themselves. Let us hope that this insight may be

extended to the government beyond the school. May they learn therefrom what participation in all government means and what the responsibilities in a democracy or a republic are. May they begin to realize that laws and regulations are promulgated for the public good, by intent at least, and that officers of the law are not our enemies that interfere, but our deputies that protect.

Pupil participation in school management needs to be distinguished from student self-government. Self-government applies not to the individual classroom, but to the school as a whole, and implies that problems in discipline are handed over to the students entirely, or nearly so. The school is usually organized into a community with a constitution, by-laws, and a staff of officers. Connection between the self-government organization and the teachers is maintained either through the principal or a committee of teachers.

In the hands of strong and enthusiastic principals, self-government plans have succeeded, and when they do succeed, they undoubtedly offer good opportunities for training in citizenship. Such plans, however, involve a factor of which teachers experimenting with school government should be clearly aware. Pupil participation in government unites teachers and students, retaining throughout the mature counsel of the teachers, whereas pupil self-government tends to divide faculty and students. Once matters of discipline have been handed over to the students, they become sensitive about having the teachers touch such matters. This tends to eliminate the influence of the teachers from a realm where their point of view and counsel are needed.

Teachers and students are partners in a joint enterprise. From different angles they are interested in the same problems and anything that divides them into opposing camps must be looked upon with suspicion. Furthermore, an organization

for pupil self-government, with its constitution, officers, and meetings, encumbers the school with a complicated, time-consuming, unnatural piece of machinery that is likely to lose sight of its own objectives. This is true even though some teachers have succeeded with it. The benefits in parliamentary practice that accrue may be more effectively derived from athletic associations, debating societies, and other extra-classroom activities, while insight into government and a coöperative attitude may be more effectively derived from participation with the teachers in school management.

10. *Extra-curriculum activities.* For the purpose of this discussion, extra-curriculum activities are divided into (1) playground activities and (2) student clubs and organizations. Our discussion obviously can do little more than bring these topics to mind. Books have been written upon them.

Emerson said that the lessons learned on the way to and from school are greater than those learned in school, and that you may send a boy to college, but the boys will educate him. The spontaneous associations and activities of children on the playground and elsewhere undoubtedly yield a rich return in social discipline. The situations presented are real and their teachings are correspondingly effective. A child who cannot adapt himself to his fellows in play or companionship must either learn to do so or flock by himself. He is being inducted by the school of hard knocks. The sphere of this school is restricted; it does little with the arts and sciences, but in its own sphere, the sphere of social discipline, it is wonderfully effective.

In cities it is coming to be the established practice to have playgrounds supervised. The crowded conditions found there no doubt make this necessary, yet too much supervision may easily rob the playground of its educational effects. Responsibility, instead of being left with the children, is likely to be

shifted to the supervisor. Instead of settling their own difficulties, the children bring them to the supervisor for adjustment. An excess of this can no doubt be avoided. The tactful supervisor knows how to keep himself in the background. He becomes one in spirit with the children, he manifests himself mainly in helping the little ones and in introducing games, and he intervenes only in extreme cases, where needed lessons in fairness and courtesy need to be impressed. The initiative and spontaneity of the children, together with their own checks and balances, are the main things to be safeguarded, for these form the basis of the wholesomely unfolded, yet disciplined, personality.

The outcomes of student clubs and organizations are quite similar to those of the playground. They contribute, among other things, to the development of social personality and they give exercise to the ability of appearing effectively in public. The adolescents who organize their own literary or debating society, who draft their own constitution, who elect their own officers, who engineer their own parliamentary procedures, who stand up before their fellows and express their own thoughts, thinking on their feet, who plan their own programs and see them through, are gaining something that will stand them in stead throughout their lives. It is no criticism of the classroom to say that these young people are gaining experiences that the classroom as such cannot supply; but it is a recognition of an activity that is supplementary to the classroom and that is, in its own way, no less educative. The school is concerned because it is the occasion that brings the young people together; without it their paths might never cross, certainly not at one point.

It was assumed in the preceding paragraph that the young people in organizing and conducting their society were unsupervised in the technical sense of that term; that there was

no one appointed to tell them what to do or to keep them from going off on tangents. They could go to anyone they pleased for advice, but they would do this of their own volition. Teachers, parents, and friends would be welcome at their meetings, certainly at some of them, but they would be there only in the rôle of guests. Initiative and responsibility would rest solely with the members and their officers. Using the name of the school, they would be responsible to the school authorities, but only as the principal and teachers are themselves responsible. All alike are entrusted with the keeping of the good name of the school. Untoward conduct would be checked up somewhere, but this is very different from having a faculty adviser whose duty it is to be present at every meeting. If the students of their own initiative invited advisers to be present at certain occasions, that is a different matter.

I am bringing this out so fully because it is highly desirable that every high-school and college student should have at least one opportunity in his school career of banding with his fellows in a worthy organization that is unsupervised. Young people need this opportunity for the fuller unfoldment of their personalities. In saying this I am not unaware of the fact that great benefits may accrue from so-called semi-curricular activities, especially in the junior high school. Junior-high-school students are in the main still too young to manage their own organizations of serious import, and to go out to meetings in the evening. It is appropriate, therefore, to have their clubs and societies meet during a designated school period with a teacher, if not in charge, at least in the background. These clubs not only furnish social training supplementary to that of the class periods, but also give further development to esthetic, scientific, and manual interests that may lay the foundation for later vocational or avocational pursuits. Furthermore, these activities get the youngsters ready for the

more independent and unsupervised activities of the high school or college.

11. *Subjective aspects.* We have so far treated social-moral education as a unit in which the objective and subjective aspects develop hand-in-hand, under the guidance of group instruction. Granted normal children, a wholesome school atmosphere, and effective teaching, this will usually be the case, but in problem children often, and in normal children occasionally, attention must be directed to the subjective or personal side. Moral integrity is ultimately an individual and personal matter. The Beatitudes are right in pointing inward rather than outward, for when a person's intentions are right, the chances are good that his conduct will be right also.

In developing the moral outcomes of education, as in developing any other outcome, the teacher has three aspects to bear in mind. These are knowledge or insight; appreciation, attitude, or conscience; and action or habit.

In moral development the keystone to the arch is found in attitude or conscience, which has its root in the feelings. Conscience is the basis of dependability when the individual is under stress or faces a crisis. Insight gives light but not power, and habit fails in emergencies. We have spoken of conscience heretofore as social or moral sensitivity. The person who is by instinct a lady or a gentleman will have little difficulty in becoming one. He is sensitive to the demands of the occasion. The vast majority of adults have required no specific or individual moral discipline in respect to right and wrong, once they were old enough to distinguish between thine and mine. They have the feeling capacities to be easily developed into reliable moral attitudes by home and school influences, just as others have the intellectual capacities for developing insight into art, science, or metaphysics.

People appear to vary in their endowment for the development of sensibilities just as they vary in other respects. This variation may be represented graphically by a bell-shaped curve known as the normal surface of frequency. There are few moral geniuses, there are many substantial, reliable people, and there are relatively few again who are totally untrustworthy. It is becoming more and more manifest that persons who are meagerly endowed with moral sensitiveness cannot be developed very far in the direction of reliability of character. The normal motives for conduct have but meager appeal for such people, much as colors have but a meager appeal for persons who are defective in color vision. The problem with these people is to arouse fully what little social-moral sensitivity they do have and to buttress this motive with others. Among these others, fear, especially fear of physical pain, appears to be most effective. We revolt against it, yet the whipping-post may for a few people spell salvation. Mere detention, even though unpleasant, is not likely to stand them in stead very long after freedom is again attained. What these people need in life is guardianship, and employment in positions where transgression is difficult. They bring others to grief when placed in positions of trust, the more so, the greater their intellectual capacity and training. The difficulty, of course, is to identify them *before* they have defaulted. Diagnostic tests have not yet been sufficiently developed. We must depend mainly on the manifestations of reliability in positions of lesser responsibility.

This is not the place to go into an extensive discussion of problem cases in the school. Suffice it to say that the teacher must realize that such cases are usually complex and that no case can be dealt with intelligently until it is understood. The tactful teacher can usually get much helpful information from the pupil, but this must be supplemented by a knowledge of his

home conditions, of his environment and companionships, of his health, and of his mental ratio. Even after the causes are found, the removal of them is often very difficult, or impossible. Homes cannot be easily reconstructed and native endowments still less, yet much has been achieved by persistent teachers, especially visiting teachers, in the former direction, and special schools are indicated in the latter.

If the keystone of the arch of character is conscience, one indispensable leg is knowledge and understanding. In the complex affairs of life it is not always easy to see what is the right thing to do and one must be enlightened. Take our present disturbed economic situation. There are undoubtedly profound moral issues involved, but what are they? Things have become so involved that specific moral obligations are hard to identify.

Before we can organize our society on the basis of both efficiency and justice, and before we can make dependable progress along economic, social, and political lines, we must first see that ethics is the master social science. What are we after in this life anyway? When are the institutions and processes of our economic, social, and political life achieving their functions? These are all questions for ethics, which reveals to us the needed criteria for judgment. After ethics (and history), the other social sciences come in as a study of the means that have so far been evolved for realizing the goals of life. Ethics needs to be purged of antiquated metaphysical speculations and extended far beyond the usual discussion of right and wrong. It needs to emerge from the cloister and take its place in the world of activity. The problems of ethics are positive. It is concerned with the consideration of personal and social values here and now; in the midst of life, not apart from it.

The problem just now is not the rehabilitation of ethics

and the smoothing of the path for prosperity, but that an ethical insight into the life about us involves a profound appeal to the intellect. Right intent without a chart and compass may land us on the rocks nevertheless.

To bring ethical insight home and make it their own, children must be led to reflect on ethical situations and to discuss them. They must do some ethical thinking. They need to appreciate the *why* of conduct as well as the *what* and the *how*.

A helpful procedure along this line is suggested by Miss McLester in her book entitled *The Development of Character Traits in Children* ('31). Miss McLester dealt with primary-grade children only, but her method may readily be adapted to all ages. All her method consists of is a free discussion, primarily by the children, of ethical problems that have arisen in the school, on the playground, or on the way to and from school. The appreciations and prejudices of even primary children are revealing. Their prejudices can usually be rationalized and modified quite readily at this stage. Older children need a periodic examination and settling down of their moral conceptions still more. Even college students will surprise one with their attitudes toward football scholarships, for example. They have been thinking, but very few of them have thought the matter through. They need assistance in full and free, but guided, discussion.

The second leg to the arch of character development is action and habituation, topics that will be more extensively discussed in Chapters XIII and XIV. Insight and conscience are indispensable, yet they are only the background for efficient and reliable social action. Action makes meaningful, clarifies and fixes the insights and attitudes; it ingrains them into the personality and supplies them with the means of ready expression.

Not only should moral instruction take its point of departure from noble or ignoble action, but the instruction should in

turn issue in action. The discharging of responsibilities in a wholesome and reliable fashion is the stimulus to the molding of character. Participation in the group activities of the school and the preparation of school tasks cannot be shifted from the individual. Only by doing his own work in a successful manner can the related satisfactions come to the student, and there is no way in which the student can ultimately escape the consequences of poor work, although often the mediation of the teacher is necessary to bring these consequences back quickly. Participation in school housekeeping is not a diversion that may be picked up or dropped at pleasure; once assumed, it becomes a duty that must be done conscientiously. It is only in this way that full satisfaction may be derived therefrom. Chores about the home need to be done in the same manner. It would often be easier and quicker for parents and teachers to do their own chores, but this would not be fair to the developing children. There is nothing like the meeting of definite and relentless responsibilities to bring to the surface the latent forces of personality and to fix these forces as reliable ingredients of character.

12. *Direct versus indirect attack.* Whenever the question of moral education comes up, the question of the direct *versus* the indirect method of attack in this field is also likely to come up. No progress toward agreement is apparently being made. For this there are several reasons. First, our terms are confused. What we call the direct attack in other subjects, we call the indirect attack in moral education. Taking the matter up from the standpoint of the moral concepts or principles, such as honesty, kindliness, thrift, and patriotism, has been called the direct attack in moral education, but this corresponds to the indirect attack in foreign language, natural science, and other subjects. It begins with abstractions rather than with concrete instances.

The second source of confusion arises from the fact that the instances on which we may base moral education vary in their degree of remoteness from experience. There are several types: (1) actual instances of conduct, positive or negative, that arise in school, such as assisting a new pupil or taking another pupil's lunch; (2) instances from history, geography, or civic life that have actually happened, such as evasion in paying taxes; and (3) imaginary instances that closely resemble actual occurrences.

Of the last (3) there are three types. There are instances (*a*) from manuals on moral education, (*b*) from literature, and (*c*) from myth and fable. Instances coming under (1) and (2) may be called *real* instances, and those coming under (3), *artificial* instances. They may be brought together in the following outline:

- Instances of conduct
  - 1. Real
    - *a.* Conduct in school
    - *b.* Conduct in life, past and present
  - 2. Artificial
    - *a.* From manuals
    - *b.* From literature
    - *c.* From myth and fable

To correspond with the usage in other subjects, whenever the attack in moral education is made through instances, real or artificial, we should call it a direct attack.

Real and artificial instances rest upon the same distinction that we make between real and artificial application exercises in fixing knowledge (see page 236), and the reason for using both types in the two fields is essentially the same. Real instances (or exercises) are more effective than artificial ones, but they are not always available when needed. If in moral education we want to develop a rounded series of attitudes, as in knowledge we develop a rounded series of insights, we are practically forced to resort to artificial instances for a part of the work.

The question is one of motivation, but when used tactfully and not too often, this is not an insurmountable obstacle.

The indirect method in moral education, as here defined, appears to be used in France and in Japan, but very seldom, if ever, in this country. It is difficult to motivate, and with children easily degenerates into a lifeless formalism. Hairs may be split and rules and principles may be learned, but the matter is too remote from conduct to influence it vitally. The approach is made, not from the angle of concrete and significant experiences, but from the angle of science. This approach is possible in a college course in ethics, where the students are ready for a systematic consideration of life's values and rules, but even here the teacher must keep life situations in clear view.

When William James said, "Don't preach too much to your pupils or abound in good talk in the abstract. Lie in wait rather for the practical opportunities" ('99, 71), he was recommending the direct attack through actual school occurrences. These, when tactfully handled, form the most effective means of developing moral attitude and judgment, but it is not always wise to postpone action until such instances have occurred. We need at times to anticipate events and to fortify young people so that they will not err at all, or so that they will rise to the occasion nobly. To assist teachers in doing this, a number of plans have been devised, some of which have attained considerable distinction in use. Among these are the anecdote method of F. J. Gould, the visual method of Milton Fairchild, the golden deeds method of M. A. Cassidy, and the conduct problem method of Charters, Rice, and Beck. These are all methods of direct attack, even though the instances used have been intentionally compiled, and when skillfully used may be highly effective.

Gould's method ('14) consists of sets of stories and anecdotes

bearing on such topics as courage, justice, service, devotion to duty, and self-sacrifice. The stories are chosen from legend, from history and from life, and all in one set, usually from three to seven, bear upon the same topic. The principle involved is not brought out baldly, but the stories are left to teach their own lesson. As used by Mr. Gould himself the method was very effective. He was an artist. When through he did not stop to moralize or to discuss, but he shrugged one shoulder a little and slowly sat down. The impression he had produced he was wise enough not to disturb for a time. Mr. Gould developed his method in London and demonstrated it in this country a number of years ago. It has, apparently, not been widely adopted.

The visual method of Fairchild consists of motion pictures depicting scenes involving sportsmanship, manliness, womanliness, and the like. Some of the pictures are posed, but the pictures on sportsmanship represent actual high-school athletic events and it is interesting to note what the camera has recorded. They make a vivid impression. Information about the method may be obtained from the Character Education Institution, Washington, D.C.

The golden deeds method is described as follows in *The Iowa Plan* ('22, 17), where a successful tryout of the plan is reported:

> The teachers select a number of short beautiful, suggestive, inspiring quotations from current or classical literature. These are discussed, memorized, and illustrated by material drawn as far as possible from the experience and observation of the children themselves. Each child is provided with a notebook to be decorated after his own taste, and entitled, "Things Which Make Life Worth While," or some similarly suggestive name. Children then begin a daily quest for good and pleasing pictures to illustrate the sentiments and ideals which they have studied. Children are surprisingly observant, apt and in-

genious in selecting illustrative material when their energy has been directed to such a quest.

The *Conduct Problems*, prepared by Charters, Rice, and Beck ('31), consist of skillfully told situations such as children actually face in life. They are brought together in five manuals, respectively for the fourth, fifth, sixth, seventh, and eighth grades, accompanied by a teacher's manual. There are thirty-two exercises in each manual, approximately one for each school week, if the teacher should choose to distribute them in that way. The exercises are chosen so as to cover the basic types of conduct. After each exercise a number of pertinent questions are raised. The teacher's manual points out six different ways in which the exercises might be used in school. Four of the titles taken from the exercises for grade 7 are: "Sauce for the Goose," "Dead Letters," "Rules are Rules," and, "Sound your Horn." They must be read to be appreciated.

The methods of Gould, of Fairchild, and of Charters *et al.* may be used to supplement the instruction in respect to situations that have actually arisen. The reading of a fitting exercise, the recountal of a series of appropriate anecdotes, or the exhibition of a suitable film when, for example, a question of courtesy has arisen, may be highly effective. In the fall when the football season is opening, or when a team has played in a questionable manner, the exhibition of a film or the reading and discussion of an exercise on sportsmanship would be distinctly opportune. So used, these devices are placed in a realistic atmosphere, but their use is not restricted to such occasions.

13. *The esthetic personality.* In the preceding pages we have occasionally used the expression *personality development.* This term supplements such terms as *character development* and *moral development*, and frequently places the emphasis just

where we want it. What we want as companions and co-workers in life are pleasing, resourceful, dependable, kindly, and interesting personalities. This is an esthetic product which is really the ultimate goal of liberal education so far as the individual is concerned. Esthetic in reference to personality signifies wholeness. It includes moral integrity and intellectual insight, as well as courtesy, refinement, and a becoming bearing. Such a personality elicits admiration much as does a landscape, a tree, or a musical symphony. The various things mentioned are further suggestive. Personalities, to be esthetic, need not be alike. A Socrates, a Shakespeare, a Napoleon, and a Lincoln all challenge admiration, but in different ways. To the extent that these personalities also elicit disapproval they harbored defects that very likely interfered with their full efficiency.

Esthetic quality and practical efficiency appear to correlate highly. As firearms, automobiles, airplanes, and other machines and instruments have been improved in their efficiency, they have also been enhanced in their esthetic appeal. This relation is not so readily seen in the objects of nature, but it appears to hold there also, and we have little reason to doubt it. The creations of artists are judged meritorious to the degree in which they depict the real, the typical, or the ideal.

The esthetic conception of personality is a distinctly helpful one in education. The adolescent is keenly alive to the esthetic, and is much concerned with the impression that he is making, both in appearance and in personality. He wants to know what he must be and do to be highly regarded. The esthetic conception gives him a new and more inclusive grasp. It opens up to him the meaning of unity and wholeness in character. The person who grafts and evades is not only unreliable morally, he is also defective esthetically, making an ugly impression. Objectively acts are judged right or wrong

or indifferent by their effects, but subjectively they are indicative of a sound, or defective, or a colorless personality.

EXERCISES

1. Point out the importance of rationalizing habits and standards of conduct.
2. What is the meaning of the statement that every man has his price?
3. What apparently is the effect of doing a daily good deed on social development?
4. Why does it not seem possible for dogmas, even when true, to compel universal assent?
5. Mention points in favor of, and points against, the taking of pledges in ethical matters.
6. Have you been profoundly influenced by a book or a poem? If so, by what and how?
7. What is wrong, if anything, with giving rewards, such as badges or gold stars for good conduct?
8. Show that social variations change the details of right and wrong but not the fundamental principles.
9. Point out the limitations of moral training owing to native endowment; to school conditions; to environment.
10. In what ways may a morality code, such as the Hutchins code, be serviceable in character education?
11. Is the following a whole or a half truth? Why? "A man's conscience is not the producer but the product of his career" (Thorndike, '06, 188).
12. What evidence is there for believing that people vary in endowment for moral sensitivity as they vary in other endowments? What is the position of the behaviorists on this question?
13. "The teacher who encourages the children to refrain from talking during the chapel exercises so that the principal will think that she is a good teacher is using unwise methods" (McLester, '31, 55). Why?

14. "The success of any course in character training rests in large measure with the teacher. With the right teacher, alive in mind and pure in heart, the question of keeping the flame of morality burning while the necessary tasks of the school day are performed will solve itself" (*Iowa Plan*, '22, 41). If this is true, what is the basic problem in moral education?

SELECTED READINGS

Dewey, J. *Moral Principles in Education*, 1–60.
James, W. *Talks to Teachers*, 169–196.
Klapper, P. *Contemporary Education*, 135–224.
McLester, A. *Development of Character Traits*, 1–147.
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Morrison, H. C. *Practice of Teaching in the Secondary School*, 399–442.

CHAPTER XII

TEACHING MOTOR CONTROL

1. *The problem.* We are now ready to move to the third rubric in our outline of the controls of conduct, the development of motor control. The problem involved here is the initiation of acts of skill, such as penmanship, typewriting, stenography, singing, playing a musical instrument, playing golf, playing tennis, gymnastic feats, sculpturing, painting, manual art, and using a foreign language. Acts of skill are involved in plumbing, blacksmithing, masonry, carpentering, engineering, dentistry, surgery, teaching, and many other callings. The beginner will naturally do such acts with a low degree of proficiency, and, unless he observes the expert closely, he will not improve as he feels that he should. He will begin to wonder what the knack is, for there is more to an act of skill than mere action.

The difference between a good and a poor mode of procedure in learning to typewrite is indicated by the following testimony:

> For nearly twenty years I shared in the management of the largest shorthand and typewriting school in this country. During this time thousands of pupils passed under my observation. In many cases this observation did not cease when they left the school but followed them in their work and experience in the office.
>
> We were then teaching typewriting by what was known as the sight method. This method involves the conscious selection of the keys. I believe I am safe in saying that out of the thousands of cases I observed, I never knew one to attain a speed in the school course to exceed forty words a minute. Twenty-five words would be nearer the average. In the course of a long post-graduate practice in the office, some did acquire

an automatic or reflex facility in the use of the machine, but it took from two to ten years to acquire it, and many did not have it at the end of the last-named time.

About twelve years ago (1898) it was conceived that the objective point in the operation of the machine was an automatic facility, and that the quicker that point was reached, the better for all parties concerned. This problem was attacked from the day the pupil entered school. An outline of work was provided that had for its purpose an invariable system of fingering. No opportunity for indecision was given. No attempt was made to show any practical results from the beginning. The main purpose was kept steadily in view until the pupil could operate the board as well in the dark as in the light.

Pupils so instructed acquired an automatic skill in three months that others, treated in the old manner, did not get in years, and some never acquired. Within the usual school course the capacity was trebled. Further, they did this increased work with less physical and mental fatigue than their sisters, taught in the other manner, suffered in doing the lesser amount. (J. A. Lyons, '11, 7.)

2. *Direct attack.* The reason why the touch method, now that we have it, gives better results in teaching typewriting than the sight method is easy to point out, yet it took teachers a long time to discover this method. It gives automatic skill more rapidly because nothing has to be unlearned. *Typewriting is attacked from the beginning in the form in which it is to be carried on later.* The sight method, on the other hand, starts with an element, looking for the right keys, that must later be eliminated if a high degree of skill is to be attained. This elimination proves to be very difficult, if not impossible, because looking for the right key has become integrated as a habit into the unitary act of typewriting. The attempt to eliminate it disrupts the whole process and throws a person back only a little beyond the point where he started. He must not only learn all over again, but he must do this with a handi-

cap. Looking for the keys has become a habit that functions whenever the person is not on his guard. This habit must be unlearned while the right procedure is being established. It can be unlearned only while full attention is again being given to the act as desired. This makes it obvious why teachers of music, typewriting, and other arts prefer students who have made no wrong starts.

In teaching foreign languages most teachers are still using a method that corresponds to the sight method in teaching typewriting. This is the indirect or grammar-translation method. This method not only does not give, but it actually interferes with the acquisition of automatic language facility.

While in the room of a college senior some years ago I heard him muttering to himself. I listened and this is what I heard him say: "Blank it, I have been studying German for six years now and still cannot read it; I'm always translating it into English." He was irritated by an impediment for which he was in no way to blame. He had been taught German by the translation method so that translating had become a habit well-nigh impossible to break. Even at that time, in his sixth year of German, they were still devoting most of the class time to translating German into English.

The immediate goals of language teaching are four, each one of which must be attacked directly. These are the development of the abilities: (1) to read the language, (2) to understand it, (3) to speak it, and (4) to write it. The order of enumeration is of little significance. All four are integral parts of language control and no one can be omitted. To develop them properly, each must be attacked in the form in which it is to be used. Reading must be developed by reading, not by translating; understanding, speaking, and writing must be developed by listening, speaking, and writing, not by recalling and applying grammatical rules.

Reading, which should include correct pronunciation, must begin with very simple sentences. Concert work is especially helpful in gaining confidence in pronunciation. When the words are simple enough, little aid from the teacher or dictionary is necessary for gaining meanings, for the context supplies most of these. The first reading exercise in Schrakamp, *Das Deutsche Buch* ('87), begins as follows:

Wo = Where

Wo ist London?	London ist in England.
Wo ist Boston?	Boston ist in Neu England.
Wo ist der Fisch?	Der Fisch ist im Wasser.

These sentences require no elaborate process of translation or grammatical analysis to bring out their meaning, but they do require distinct pronunciation, in which the teacher must lead and the pupils follow.

The secret of gaining facility in reading a foreign language, as in English, is found in reading a great deal, beginning with very simple material and moving only gradually to more difficult forms. This develops a feeling for the swing and genius of the language. Points of grammar should not be brought up by the teacher, for they are more likely to impede than to help. When brought up by the pupils, which they will do soon enough, they should be answered with care. Grammar is a language auxiliary and can give little real aid till after the basic language control has been acquired. Once acquired, language control can be perfected by the aid of grammar, but to attempt to gain it through grammar is to be rewarded by a lame, halting, and artificial product. It is doubtful that any systematic study of grammar should be attempted before the third year of language study.

In the other three aspects of language control the direct attack means in principle the same as it does in reading. Writing must come after the student has acquired some ability

to think in the language and then he must be given an opportunity to express his own thoughts. The translation of sentences from English into the foreign tongue must be religiously avoided. This is not composition and is subject to the same fallacy as translation in the other direction. It sets up writing and speaking inhibitions and develops habits that must later be eliminated. What may be accomplished by the direct method in composition is well exemplified by Morrison ('31, 490).

The direct attack in foreign language teaching does not imply the exclusion of the use of English with beginners, but it does imply that its use will be gradually reduced and that it will be eliminated by the end of the first year. The students will use the language if it is expected of them and if the attitude of the teacher is sympathetic. Plenty of mistakes will be made at first, but it is unwise to notice them too meticulously. Improvement will come gradually. Let the teacher take heart from the gradual manner in which accurate control over the mother tongue is acquired.

It was noted in connection with typewriting that the touch method gives automatic facility about three times as rapidly as the sight method. No quantitative studies comparing the language control acquired by the direct and the indirect methods of attack appear to be in existence, but such evidence as we do have indicates that the direct attack is even more superior in language teaching than in typewriting. In our Americanization schools, where the direct attack is generally used, foreigners are given a working command of English in a few months. A beginning English class that I visited in a *Realschule* in Hamburg some years ago had a good control over English after studying the language one school year. The class consisted of boys, corresponding to our seventh grade, who had been studying English by the direct method

from October until July. Every one of these boys could read simple English readily and could partake in English conversation. They were equipped to make their way anywhere in an English-speaking country. The results reported by Morrison in composition ('31, 490) are almost infinitely beyond what is being achieved in our usual high-school classes in Latin.

Typewriting and foreign language study exemplify very well the importance of correct procedure in developing a series of related skills. The same principle of procedure is involved in learning penmanship, shorthand, singing, playing a musical instrument, public speaking, and English composition. In each of these the act to be developed needs to be attacked in the form in which it is to be used, without the establishment of intervening habits. This is not the easy road, either for the student or for the teacher, but it is the efficient road if a high degree of skill is to be established. To look for the right key in typewriting, to draw the letter in penmanship, or to translate the foreign sentence into English, may seem to give results more quickly in the beginning, but it does not develop the skill in the form in which it is to be used. It develops an inferior product that later needs to be reconstructed at heavy cost if genuine facility is to be attained.

3. *Form and execution.* Efficient procedure in doing an act of skill involves: (1) good form, (2) easy execution, and (3) in many cases an appropriate instrument.

Form has reference to the position of the body, or some of its parts, that may be directly influenced by consciousness before the act is begun. In penmanship it includes sitting square and upright on the chair, holding the pen in the approved manner, letting the right forearm rest easily on the table, and holding the paper in the proper position with the left hand. In tennis it includes holding the racket so as to form a straight line with the arm, facing the net with the body sideways, and

keeping the eye on the ball. In typewriting and piano-playing it includes the manner of sitting and of holding the arms and hands. In singing and in speaking it includes the positions of the head, shoulders, chest, and mouth parts, and so on with every other activity requiring skill. Good form may be more fundamental in such acts as writing, playing a musical instrument, and performing athletic feats than it is in using tools and manipulating laboratory apparatus, but it is absent from none.

Whether execution is looked upon as a separate factor or as an aspect of form, it is sufficient to note that with correct position a person may still perform a bungling act. A person may hold the pen correctly and still attempt to write with a pure finger movement, or he may hold the racket correctly and still strike with a stiff and awkward movement. Directness and freedom of movement must be given attention no less than proper position. Abandon and confidence appear to be its best subjective helpers.

Notwithstanding the maxim that a poor workman blames his tools, it cannot be denied the quality of the tools may make a vast difference in achievement where tools are needed. One cannot play a good game of tennis with a baseball bat. The good carpenter wants good tools and he wants them in good condition. Most persons can write more easily with a thick, cork-grip penholder than with one having a thin metal grip. Tennis experts usually insist upon a particular type of racket, and similar things hold true of baseball players, golf players, and other experts. Appropriate attire also has a significant bearing on freedom of movement in acts of skill.

4. *Method: demonstration and imitation.* The basic method used in initiating an act of skill is demonstration on the part of the teacher and imitation on the part of the pupil. In penmanship, let the pupil observe how the teacher holds the pen,

how he moves his arm and fingers, and how he sits at the desk and then let him try to do likewise; in tennis let the beginner observe how the expert holds the racket and how he strikes. In foreign language instruction let the teacher set the model in pronunciation and let the students imitate him. This is the way we learned to speak English; we copied our elders.

Personal demonstration on the part of the teacher is the method most easily available in giving students models to strive for, but this has in recent years been supplemented by motion pictures when the appeal is to eye, as in tennis, golf, and industrial processes, and by sound records when the appeal is to the ear, as in foreign language instruction. Both of these methods have proved to be useful, although their main field appears to lie outside of the schoolroom.

5. *Trial and success.* After the student has from observation gained a general idea of the act as a whole, he must be given a free and unrestricted chance to try it out. A certain amount of experimentation may wisely precede any instruction whatever, for the lack of skill will bring to the student's consciousness the need for assistance. After the goal is in mind, an abundance of practice is essential. All motor control, and mental control also for that matter, is gained gradually. There is at the beginning a large amount of excess nervous discharge and a consequent profusion and indefiniteness of movement. The right goal is in mind, yet the right movements are hit upon more or less by chance. These right movements are recognized and because of their success they stimulate a keen feeling of satisfaction. This vivifies the goal and gradually narrows down the field of experimentation. Persistent effort will bring the reward of success. What teachers need to remember is that growth from indefiniteness to definiteness of control is at best gradual and that individual differences among pupils are great.

6. *Individual differences.* In developing motor control, as in other phases of education, individual differences should never be lost sight of; they affect every phase of the work. The limits of achievement for different people vary greatly, and a limit that one may reach in a week another may not reach in a month. All normal pupils should learn to write legibly but not all can learn to write beautifully.

Good form is not just one best form; it varies to a considerable extent among individuals. We are not all built alike. Few women are built to throw as a man throws, and not all men throw alike by nature. The structure of arms and hands differs so that the correct method of holding the pen and moving the arm in writing for one need not be the correct method for another. Within limits, each must find his own point of greatest freedom of movement. Teachers need to become skillful in identifying this point in different individuals.

7. *Supplementary directions.* Verbal directions and other aids find a place after an act is started. A pupil can make use of very little instruction before experimenting with the act itself because he has no basis for giving it meaning. In fact, much preliminary instruction is likely to prove a handicap. In trying to remember his instructions the pupil will find his responses inhibited altogether. We have here again an instance of the plunge that the direct attack always requires. Instruction can help only after there is something to help. Mastering an act of skill requires action and the sooner this begins the better. A man of my acquaintance taught his boys to swim very quickly when they reached the age of six or seven by tying a rope around their chests and dumping them overboard in deep water. "Now paddle like a dog," he told them, and they did. When they sank below the surface too long, he pulled them up, but the first lesson lasted five minutes, sink or swim. It took only one or two such lessons to

learn to keep afloat. After that progress was assured and the boys gradually picked up the various strokes.

The person who gives supplementary instructions must have an analytic view of every phase of an act; he must know just where and how an imperfection occurs, and he must have at hand a technique for correcting the imperfection. Often it is enough merely to direct the attention of the learner to his imperfection and let him go through the motion slowly under guidance after observing the teacher. In penmanship some pupils profit by having the teacher guide their hands through certain movements. This gives them the "feel" of what is wanted.

In acquiring the pronunciation of new sounds in a foreign language, imitation frequently proves inadequate, especially after the age of about twelve when language habits have become set. English, for example, does not have the sounds *ü*, as in *übel*, and *ö*, as in *öl*, found in most of the Continental languages, and American students often find it difficult to acquire these sounds. How can they be helped? By analyzing the sounds and combining the elements. *U̇* is made up of $\overline{oo}$ and $\overline{ee}$. Let the students pronounce these sounds separately. Now let them put their mouths in position to say $\overline{oo}$, but say $\overline{ee}$. There you have it. The rest is practice. The *ö* sound is a combination of the sounds $\bar{o}$ and $\bar{a}$. Again let the pupils put their mouths in position to say $\bar{o}$, but say $\bar{a}$. This brings about the desired result, but it takes practice to perfect it. A new habit or act of skill is being established and that requires drill.

Just what techniques to use in guiding students over special difficulties is a matter of special method and must be left to the experts in the various fields. Teachers need to be made alive to the accumulation of such techniques.

8. *Place of attention.* In a developed act of skill the atten-

tion of the operator is not on the elements of the act, but on the outcome of the act. In tennis the attention of the player is on the ball and on the place where he wishes to put it. In penmanship, although not in composition, the attention is on the letters or words as wholes, not on the elements. This is in principle true also of the beginner but for him the act must often be broken up into smaller units and he then pays attention to these units. In penmanship he may have difficulty in getting a satisfactory oval to the *o*. Let him concentrate on that and perfect it: *oooo*. Now let him again include this unit in a larger unit that becomes the center of attention.

It is wise also to direct the attention to what one wishes to do, not to what one wishes to avoid. Action follows the idea that is in the center of consciousness, not the one that is in the margin. Many a beginner on the bicycle has struck a rock or a telegraph pole when that was just what he was trying to avoid. In driving an automobile, keep your mind on the road, not on the bank. A wrong model is helpful only so long as it serves to lift into clearer consciousness the right form; when it begins to usurp the center of consciousness it becomes pernicious.

To redirect attention to the elements of a perfected act is to disrupt it. This is well known and is humorously exemplified by the following:

> The centipede was happy, quite,
> Until a frog, in fun,
> Said, "Pray, which leg comes after which?"
> This wrought her up to such a pitch,
> She lay distracted in a ditch,
> Considering how to run.

The reason for such disruption is quite evident. In a perfected act each phase follows the next on the basis of a smoothly working unit. To bring any phase back into consciousness breaks the circuit and shunts the nerve current off its track.

As the actor really does not consciously know just how the habit runs, the attempt to guide the act consciously only leads to confusion and awkwardness.

9. *Eliminating superfluous movements.* We have already emphasized the point that an act of skill should be learned in the form in which it is to be used; scaffolding should be eschewed, and when adopted at all it should be eliminated at the earliest possible moment, lest it become integrated as an encumbrance on the act. So much is clear. There are, however, additional movements that may also require the teacher's attention. In the process of excess discharge when a motor act is begun, many needless movements are started. The child learning to write strains his body and contorts his face; the young orator fumbles his watch chain, rolls up the edge of his coat and moves about nervously; and the person learning to ride a bicycle uses every muscle in his body, thus getting very tired, marveling, perhaps, how a person could ride even ten miles a day.

As a rule these adventitious movements that are not used as scaffolding drop out as attention is withdrawn from them and is directed to the successful movements. Occasionally, however, some of them tend to stick and these must then be given specific attention by the teacher. This needs to be done early, for the longer they run the more difficult it becomes to remove them. A college student of my acquaintance would always contort his face and play his tongue out of the corner of his mouth whenever he used a pen or pencil. We made all manner of fun of him, but he continued the practice, maintaining that he could not write unless he did this. The movements had become firmly integrated with the writing response. In the primary grades it would no doubt have been easy to eliminate the movements.

In every line of activity there is a danger of adventitious

movements becoming habitual. Such movements interfere with good form, they detract from efficiency, they consume a needless amount of energy, and they are disturbing to the observer. All of these handicaps apply with special force to teaching, which is subject to good or bad form no less than other activities. The teacher who talks in a shrill, loud voice; who repeats everything pupils say; who moves back and forth nervously before his class; who bobs up and down in his chair; or who toys conspicuously with books, papers, pencil, or rubber band, not only interferes with the efficiency of his teaching, but he also exerts a deleterious effect on the personality of his pupils.

10. *Summary.* In establishing acts of skill the principle of direct attack holds with no less force than it holds in other types of teaching. Here it means that an act should be started and practiced in the form in which it is to be used. Scaffolding should be avoided because it is not really needed, and it does much harm. The basic method of initiating an act of skill is not verbal instruction but demonstration by the teacher and imitation by the pupil. Good form and freedom of movement in execution are of basic importance but individual differences must not be lost sight of. The attention must be directed to what is being achieved, whether this is the whole act or a part of the act. Supplementary directions are helpful along the way in lifting pupils over difficulties. Abundance of practice on the basis of trial and success is the pupil's big part in the enterprise. Superfluous movements, which militate against full efficiency, must be watched for in the initial stages and eliminated.

EXERCISES

1. Is the maxim, "practice makes perfect," sound as it stands? If not, how would you modify it?
2. List the elements of good form in teaching. How may these be developed? What is the advantage of each?
3. Is pronunciation an integral part of mastery in a foreign language or may reading and writing be taught without pronunciation?
4. Name two or three external conditions other than instruments and attire that have a bearing on acts of skill. Where do these apply?
5. How do teachers of singing proceed in developing tone quality in their pupils? Compare with the principles brought out in the text.
6. How is the power of volitional control acquired by the infant? (Munsterberg, '14, 181.) Compare with the acquisition of the beginnings of knowledge. (Ruediger, '10, 284.)
7. May seemingly superfluous movements nevertheless be helpful in such acts as writing, singing, playing the violin, tennis, and pitching in baseball? If so, what is their function?
8. How does the ability of accurate motor coördination vary with maturity? What bearing has this on teaching sewing, drawing, and penmanship? For example, can the arm movement in penmanship be acquired before the age of adolescence?
9. A teacher of high-school English once came to me in distress about her spelling. She used to be an excellent speller, she said, but since she had been teaching composition for a number of years she had lost most of this ability. She wanted to know what to do to regain it. What would you have told her? Why had she lost her ability to spell?
10. Write the letters of the alphabet and the numbers from 1 to 50 with the left hand.

    On each of ten sheets of paper draw a star about two inches in diameter. Set a mirror back of one sheet and, by watching only the image in the mirror, trace the outline of the star with pen or pencil. Do the same for the other nine stars. To

avoid looking at the original figure, place a paper or cardboard screen between your eyes and the sheet.

What have you learned from these experiments about the method of trial and success? the difficulty of acquiring new acts of skill? overcoming established habits? Did reflection assist materially? What suggestions, if any, for working with beginners have you received? What effect may the pursuit of advanced work by teachers have on their own teaching?

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CHAPTER XIII

FIXING MOTOR RESPONSES

1. *The problem.* In the nine chapters immediately preceding we have considered the procedures that analysis, experience, and experiment have demonstrated to yield the best results in initiating the various controls of conduct, and we are now ready to pass to the problem of fixing these controls so that they will function automatically, or at least with a minimum of conscious guidance. Habit is the great servant and balance wheel of life and to say that nine tenths of what we do is ruled by it is well within the mark. The problem, therefore, of assisting the organism in reducing the uniform aspects of response to efficient systems of habit becomes an important one.

2. *Types of habits.* Disregarding minor subdivisions for the time being, there are three basal types of habits, just as there are three basal types of conduct controls. These may be called intellectual habits, emotional habits, and motor habits. The term *habit*, however, is commonly applied only to motor responses that have become automatic, and we speak of intellectual habits as fixed or memorized knowledge and known modes of procedure, and of emotional habits as attitudes, tastes, biases, and prejudices; but from the neural standpoint all alike are habits, for they are all based on fixed modes of neural functioning.

Better than the term *emotional habit* would be the term *organic habit.* Emotional habit covers such rubrics as tastes and attitudes well enough, but not acquired cravings for tobacco, alcohol, and drugs, while organic habit covers them all equally well. The term is logically also very satisfactory.

Tastes, attitudes, and cravings are all organic responses in the sense of being inclinations of the body as a whole, while motor and intellectual habits are more restricted in their action.

3. *Variations in procedure.* The modes of procedure in fixing these three types of habits have some elements in common, but they also present significant differences. From the standpoint of teaching, these differences are more important than the likenesses. A mode of procedure that may be appropriate for fixing a motor response may be quite inappropriate for fixing an item of knowledge or an attitude. These differences have been all but overlooked in our pedagogical literature, where the whole matter has usually been lumped together in a chapter on habit or on the drill lesson. Under either designation the discussion has usually been restricted to physical habits, such as writing and dancing, and to fixed associations such as learning facts in history and geography.

4. *Drill versus use.* There has been much discussion in the past in respect to the relative merits of drill and use or application in fixing the products of teaching. The champions of drill have maintained that the secret of an education that sticks is frequent and unfaltering repetition, while the champions of use have maintained that the application of knowledge in varied and interesting situations is the key to permanency and that drill is deadening, that it is the cardinal sin of pedagogy, and that it ought to be eliminated from the schoolroom altogether.

This divergence has arisen from a failure to distinguish the procedures that are useful in fixing the various types of responses. As is so frequently the case when people disagree, the champions on the two sides have unwittingly been talking about different things. When drill is defined as the systematic and accurate repetition of a response for the purpose of making it automatic, then drill is the natural and appropriate method

for fixing motor responses, to which it is essentially restricted. Knowledge and tastes and social attitudes, on the other hand, become fixed naturally and appropriately through use or application in varied and meaningful situations. Drill, as defined above, if not inapplicable, is at least inappropriate here and undoubtedly sounds the death knell of interest.

That drill or repetition is the natural mode of procedure in developing and fixing a motor response may be verified by observing what people do of their own accord in developing an act of skill. Boys interested in tennis will practice by the hour in order to master a certain stroke, and they will do this when they might be playing a game. A person interested in penmanship will practice strokes, letters, or words whenever he has the opportunity. One interested in music will go over a difficult passage again and again, even though he has no teacher to face on Saturday. These people have no choice; drill is their only road to perfection; but for them it is not uninteresting.

5. *The place of drill.* Drill is here used in the narrow sense as defined above — the systematic and accurate repetition of an act for the purpose of making it automatic. This restricts drill to responses that rest upon motor memory, a restriction that is essential if confusion is to be avoided and if sound teaching procedures are to be followed. The procedures that are appropriate in fixing knowledge, attitudes, and tastes are discussed in the next chapter.

If repetition were the only thing that the teacher had to keep in mind when guiding the development of an act of skill, the problem would be simple, but it is not. The procedure is complicated by at least three aspects which must also be kept in mind. One of these is *good form*, which is prominent in such acts as penmanship, tennis, golf, singing, and playing a musical instrument, but not in spelling and correct pronunciation. Another is a closely related series or *hierarchy of habits*,

prominent in telegraphy, shorthand, typewriting, and mastering a foreign tongue, but much less prominent in athletic feats and singing. A third is *technical skill*, prominent in drawing, painting, sculpturing, cooking, sewing, manual arts, and laboratory technique. These acts involve little in the line of form or series of habits, but much in the skillful use of tools and machines and in the handling of material.

To the extent that an act of skill involves good form, drill on the essential elements of the act is needed *before* the act is put to practical use, and this is true also in acts that involve hierarchies of habits. The person aspiring to become an expert in music, penmanship, tennis, or golf must be willing to spend much time on what appear to be monotonous exercises. A music teacher will sometimes keep a student of singing on voice-placing exercises for a long time, with the injunction that rote singing must not be indulged in. For learning golf special places are provided where a person may practice driving without cluttering up the links. Teachers of shorthand and typewriting rigidly exclude the copying of useful material at the start. What they want is a series of exercises, formal and meaningless from a practical standpoint, that will develop thoroughly and systematically the various elements of the art according to a preconceived plan of unfoldment, and that will weld these elements together into a facile sequence.

Only after automatic mastery over the elements in sequence has been acquired will the student be turned loose on practical material. When he is turned loose earlier, incorrect habits are likely to creep in and an inferior technique is likely to be developed, just as good form in penmanship, music, and tennis is likely to be lost when it is used in practical situations before it has become fixed. Art rests on the perfection of trifles, one at a time.

What has just been said in respect to acts involving good

form and hierarchies of habit is largely out of place in respect to acts involving technical skill, but not altogether. The small amount of form that technical skill requires may usually be mastered while doing real things, but this is much less true of the acquisition of the skill itself. Tools and machines need to be understood before they can be effectively used and intelligently cared for. Where valuable materials, such as lumber, metals, paints, and canvases are involved, inexcusable waste would be incurred if the student were not first given practice exercises on less valuable material. In mastering a difficult joint or a fine finish in manual training, the student is very properly given practice exercises *before* he is permitted to incorporate his work in a mahogany table or an oak filing cabinet. The student's technical skill must be given a good start before he may safely apply it in practice. This is, or should be, true also in sewing, cooking, and painting. These are all arts that rest upon teachable skills and to attempt them without antecedent practice is likely to prove wasteful and disappointing.

While in the manual and plastic arts it is fallacious to plunge a student into work of economic value without antecedent practice exercises, it is even more fallacious never to let him advance beyond practice exercises. Nothing but formal work in manual training, home economics, and painting is indeed a pedagogical sin; it is deadening. In all of these realms, the doing of real things should be introduced as soon as the technical skill has been given a fair start. This is necessary to arouse motive and stimulate care, which are the natural conditions for growth. Making real things greatly aids in developing a conscience against spoiling good stock, and when the student is given some choice in what he does the resources of his own nature are being enlisted and are given a chance for development. Fortunately, it is easy to find real projects in manual training, home economics, and painting.

6. *Thoroughness.* In acts that involve a sequence of integrated habits it is of special importance for both teacher and pupils to appreciate the value of thoroughness. A good instance of this came to my attention a few years ago in respect to the son of an instructor in economics in one of our larger universities. This son was an only child nine years old. Both the father and mother thought the world of him. They appreciated his inherited genius and were glad to let him participate in their learned conversations. They did not send him to the kindergarten or to the primary school, for to them he seemed to develop quickly beyond the trivialities of these schools. He learned to count and picked up reading without much effort and his parents encouraged him in the development of mature interests. He had books on history, geography, and science in which he took much interest. Having no brothers and sisters to distract his attention to childish things, he lived in the mental realm of his parents. But when he reached the age of nine, both father and mother agreed that he ought to go to school. The mother presented his case strongly and succeeded in entering him in the fifth grade. It soon became evident, however, that he could not do the work of that grade and the teacher gained his mother's consent to let him try that of the fourth. Here again he failed to make good, and the mother finally agreed to let him repeat rapidly the work of the third grade. Here he again did not get along, and the teachers began to wonder if the boy was mentally sound. Of course they did not breathe their suspicions to the mother, but they did surreptitiously take the boy over to the psychological clinic at the university. The child tested at age mentally, thus proving the suspicions of the teachers quite wrong, but educational tests quickly revealed the fact that he had no mastery over the number combinations and that he could not read with accuracy. He did not know all of the letters and his calling of

words was mainly guesswork. The psychologist advised that he be placed in the first grade and that he be taught systematically how to read and how to add and subtract. This was finally done, and after he had mastered the elements, which proved to be quite difficult in his case because of humiliation and of what he had to unlearn, he caught up with the pupils of his age and made normal progress.

This instance tells its own story. Reading and arithmetic rest upon elements that must be mastered before more advanced work involving them can be successfully attempted. To attempt to go ahead on any other basis leads only to discouragement and failure. Colvin once told me of an unpublished experiment at Brown University in which the attempt was made to teach a young woman to typewrite while deliberately arranging the work so that she could not master the elements as she went along. She started in with a fine spirit, but soon became discouraged and in three weeks gave up the work in utter hopelessness.

The principles involved in learning a series of related habits are well brought out in Bryan and Harter's classic "Studies in the Physiology and Psychology of the Telegraphic Language," published in the *Psychological Review* for 1897 and 1899, vols. IV and VI. Learning to receive is described by them as follows:

> (*a*) At the outset one "hustles for the letters." (*b*) Later one is after words. (*c*) The fair operator is not held so closely to words. He can take in several words at a mouthful, a phrase, or even a short sentence. (*d*) The real expert has all the details of the language with such automatic perfection that he gives them practically no attention at all. He can give his attention freely to the sense of the message, or, if the message is sent accurately and distinctly, he can transcribe it upon the typewriter while his mind is running upon things wholly apart.
>
> In the first days one is forced to attend to letters. In the

first month one is forced to attend to words. If the learner essays a freedom for which he is unfit, suddenly a letter or a word which is unfamiliar explodes in his ears and leaves him wrecked. He has no useful freedom for higher language units, which he has not earned by making the lower ones automatic. Only when all the necessary habits, high or low, have become automatic, does one rise into the freedom and speed of the expert.

(1) There is a certain number of habits which are elementary constituents of all the other habits within the hierarchy. (2) There are habits of a higher order which, embracing the lower as elements, are themselves in turn elements of higher habits, and so on. (3) A habit of any order, when thoroughly acquired, has physiological, and, if conscious, psychological unity. The habits of lower order which are its elements tend to lose themselves in it, and it tends to lose itself in habits of higher order when it appears as an element therein.

One conclusion seems to stand out more clearly than anything else, namely, that in learning to interpret the telegraphic language, *it is intense effort which educates*. Men whose receiving curve has been upon a level for years frequently rise to a far higher rate when forced to do so in order to secure and hold a position requiring the higher skill.

These words are clear and forceful and need little comment. The hierarchy of habits involved in the telegraphic language is well pointed out, and it is made clear that without thoroughness a person cannot hope to "rise into the freedom and speed of the expert," but that a letter or word which he has not mastered may "explode" in his ears and leave him wrecked. "It is intense effort which educates," here as elsewhere.

7. *Plateaus.* The study by Bryan and Harter revealed that learning the telegraphic language develops according to a curve that resembles an irregular stairway. Progress is at times rapid and at other times slow. The slow or level places on the curve were christened plateaus by Bryan and Harter and it was their opinion that such plateaus are a characteristic

of all learning curves. In learning the telegraphic language they account for them by the groups of interdependent habits that have to be acquired. They are caused by the time taken to ingrain a habit of any order. While this habit is being ingrained, the learning curve is relatively level, and not until it has been established can the learner rise to a higher level of skill.

If this explanation is correct, and it certainly sounds reasonable, plateaus may be expected in the learning curves of all acts that involve hierarchies of habit. Some have questioned the legitimacy of plateaus altogether. They have maintained that they are the result of lapses in interest and that they need not occur under ideal teaching conditions. What is needed apparently is further experimentation and it will be essential to treat the various types of acts of skill separately. The measures of learning must be restricted to the accuracy and the speed with which the acts are expressed.

No matter how plateaus are caused, they may be dealt with intelligently and sympathetically by teachers. If the cause is known, they may be dealt with so much more intelligently. Students in all stages of education feel encouraged so long as they are making observable progress, but when this is no longer true, they rapidly become discouraged. If now it is explained to them that they have struck a plateau, that this is apparently a natural stage in learning, that they are really making progress in that they are ingraining habits or integrating knowledge, and that they will gain their release and rise again as soon as this process has taken place, they are likely to maintain their courage and proceed more diligently with their work.

8. *Motive and purpose.* It has been implied throughout the discussion so far that the intense effort that is necessary to establish an act of skill is motivated effort. It is the student who is interested in penmanship, in music, or in tennis, and

who knows what he is after, who will put effort into his practice and advance beyond the mediocre. Perfunctory performance does little good, and may do harm, for it is sure to establish an indifferent, if not an antagonistic, attitude, and it may retard rather than further the act.

There is no more difficulty in motivating the acquisition of acts of skill than in motivating anything else that is worth while. Pupils have no difficulty in formulating purposes in penmanship, drawing, and reading and in recognizing the practical worth of these subjects. These arts are used not only by adults, but are needed every day by the pupils themselves. When pupils are normal and are sufficiently mature, they require no special motivating devices to get them interested in these arts. The appeal of music, when properly presented, is immediate and strong. Practically all pupils would like to be able to play or sing and they are usually quite willing to try themselves out. With those that have no talent, interest will soon flag, and for them extensive training is an agony that is not worth the cost. Reading and writing are needed by all, but in music most of us may be content to be consumers, leaving the field of production to those with talent.

Acts of skill have an advantage in motivation over many other subjects in that they have greater fascination in themselves. To see another write well, draw well, play well, bat well, or shoot straight arouses an immediate desire to do likewise, and this interest feeds on itself. The greater one's proficiency in an art, the more satisfying its indulgence becomes. Teachers may well be alert to take advantage of this fact.

9. *Definiteness of goal.* A student's interest in an act of skill is greatly enhanced by having in mind a definite goal or pattern toward which to strive. The ease with which such goals are set varies with different subjects. It is relatively

easy in penmanship, drawing, painting, sculpturing, and manual training where the achievement is a product that is permanently open to inspection. It is not so easy in music and in athletic feats where the achievement is a phenomenon that has to be carried in mind or frequently reproduced.

Penmanship scales are being freely used by teachers in setting definite goals in handwriting. These scales either are posted in the schoolrooms or placed in the hands of the children, and the children may then measure their own progress by means of them. In doing this the children usually take a keen interest, which is all to the good as an incentive. Scales are available also in drawing and they could be produced in the manual arts. In the latter fields, however, the achievements of a master usually serve very well as goals to be striven for.

In music and in athletic feats, goals are revealed by the performances of experts and by the demonstrations given overtly before pupils. These stimulate ambition and set patterns that are usually carried in mind well enough to guide practice. What the teacher needs to look out for is that the pupils are fired with the significance of the work, that they know just what to do, and that they have undisturbed and suitable opportunities for practice. Opportunities for practice should especially be given immediately after interest has been aroused.

10. *Working against time.* A splendid stimulus for achievement in all lines of work, with the possible exception of creative achievement, is a limitation of time. A student who has only twenty minutes in which to get his lesson will often do it better than if he had an hour. A liberal arts student, a strong, healthy young man, carrying fifteen hours of work, came through with poor grades at the end of the first semester. The dean referred his case to a special committee, with the writer as chairman, to determine if his load ought to be reduced to twelve hours.

The committee quickly discovered that the man was wasting much time, that he was dawdling over his work, and that more, rather than less, work might prove to be the stimulus that he needed. Accordingly the committee recommended that his load be raised to eighteen hours. This was done, and the quality of his work increased from an average of D to an average of C.

"If you want a job done quickly, get a busy man to do it." Excessive time leads to procrastination and dawdling which in themselves tend to become habitual. A little experiment bearing upon this point is reported by Garry C. Myers in the *Journal of Educational Psychology*, vol. 5, p. 115. He gave two similar groups of pupils the task of learning four sets of words associated with numbers. The first group was told to learn the words as quickly as possible, but no time limit was set, while the second group was told that it would have just 9 minutes. The average time taken by the first group was 14 minutes and 47 seconds, the variations running from 8 minutes, 47 seconds, to 22 minutes, 40 seconds. The results in the two groups, as revealed by a test, were practically identical.

When pupils are making progress in handwriting along a penmanship scale, the time element can be introduced by setting a definite date for the attainment of a certain quality. A certain pupil now writing quality 10 on the Thorndike Scale might be given two weeks to attain quality 12. Naturally the goals for different pupils would have to be set separately.

Some private music teachers hold recitals for all of their pupils once a month. These recitals are used for the attainment of goals in achievement. The month sets a definite time limit for the assigned task and the prospect of playing before the other pupils and the mothers serves as a powerful

stimulus. The social element that this procedure introduces is also worth noting.

The speed with which an act is performed needs to be distinguished from the rapidity with which it is learned. Speed in performance is a secondary factor in music, but not in penmanship, stenography, typewriting, telegraphy, reading, and calculation. When a person's occupation directly involves any of these arts, he must be able to do them rapidly as well as accurately, if he wishes to advance beyond the median rounds of the ladder.

As pointed out in the quotation from Bryan and Harter, motive may be a tremendous aid in advancing one to higher stages of skill, but practicing against time may also be a significant aid. In developing facility in silent reading, arithmetic, stenography, and typewriting, teachers are making effective use of timed exercises. Since the teaching of silent reading has achieved a place in the curriculum, it appears that we are developing rapid readers in larger numbers than we did a generation ago.

In developing the speed of an act, teachers must never forget that accuracy holds a place above speed. Inaccurate work, no matter how rapidly done, is of little value, but accurate work is always valuable.

To a large extent speed and accuracy develop hand in hand, but attention must be given to accuracy before it is given to speed. Accuracy implies the establishment of good form, the ingraining of sequential habits, and the mastery of technique, and when attention is shifted to speed too early, these elements are almost sure to suffer. They are, however, the basis of both speed and accuracy and so must be well cared for before the emphasis is shifted to speed.

There is little sense in developing high speed in an act that is not soon to be extensively used. Reading and writing are

used extensively by pupils in school, and presumably pupils taking stenography and typewriting will soon enter on commercial positions; but pupils do not use the processes of arithmetic or algebra extensively in school and very few are likely soon to use them extensively outside. Business men complain that pupils coming from our elementary or high schools are slow and inaccurate in their arithmetic. That they are slow is granted. They have had no occasion to use their arithmetic extensively. The fault-finding business men were slow also when they started in, if they could recall that time. Granted that the youngsters are well grounded, that they *understand* the processes to be used, and that they have the needed capacity, they will soon develop speed. Had their speed been more highly developed in school, the chances are that it would have been largely lost, anyway, through disuse before finding employment.

Inaccuracy is not so easily excused. To develop accuracy in the general school is far more difficult than in the vocational school or on the job. The stimulus of *real* responsibility is too far removed. Insistence upon accuracy in the school is not the first thing; understanding precedes it. Appreciation of the importance of accuracy also precedes it. These can be developed only through vital and meaningful teaching, but granted their development, accuracy must also be insisted upon. Clearness of understanding and intensity of attitude are the qualities that the school must develop as a basis for, and an accompaniment of, accuracy.

11. *Length of practice periods.* The section on motive has already implied the importance of attention, which is the child of interest, in developing an act of skill. Because of the excess enervation present at the start, the rapidity with which unexercised muscles tire out, the relative monotony of practice exercises, and the concentration of attention that is re-

quired, drill work is highly fatiguing, especially in the early stages. This makes it necessary for drill periods to be short when acts of skill are begun. As proficiency is gained, the periods may be lengthened.

Although a number of experiments have been performed in this field, it is not possible to say just what the optimal length of a practice period should be. It varies with the individual, with the interest engendered, with the type of work, and with the stage of development of the act. Children in the primary grades learning to write usually show signs of fatigue in five minutes, but after they have gained some mastery over the art they can practice writing for fifteen without becoming overfatigued.

The practice periods now generally used in school appear to fit experimental evidence quite closely. In the lower grades, periods varying from ten to twenty minutes appear to be appropriate, in the upper grades, fifteen to thirty minutes, and in the high school, twenty to forty minutes. The educated judgment of the teacher must continue to be the guide. Mere *ennui* should not be yielded to. The lesson of patient application, of seeing a thing through faithfully and cheerfully to the end, must also be learned.

12. *The distribution of periods.* Should practice periods come once a day, twice a day, every other day, or how? Here again there is no one single answer. Frequent short periods of practice appear to yield the best results in the early stages, while with the improvement of skill the periods may become both longer and farther apart. A second practice on the same day appears to be slightly less beneficial than the first practice.

Our usual school procedure of having work come every day appears to fit the situation as well as any that could be devised, especially for the elementary grades, and perhaps also for the high school. College students appear to get along just

as well when lessons come every other day as when they come every day, perhaps better. Only fully matured students, such as teachers in service or graduate students, appear to follow weekly exercises without loss; less mature students lose contact.

Private music teachers usually want their pupils to practice an hour a day and some of them still insist that this hour must be done at one sitting if full benefit is to be derived. With respect to beginners, and with respect to all children under fourteen, they are certainly mistaken. Enough experimentation has been carried on to demonstrate that, instead of practicing one hour at one sitting, better results would be obtained with young beginners if this hour were divided into four periods of fifteen minutes each, to be followed by three periods of twenty minutes each as proficiency increased, this in turn to be followed by two periods of thirty minutes each. This would avoid the loss owing to diminishing returns in the long period.

It has been noted by psychologists and sagacious students that some gain in proficiency is made, at least apparently, between practice periods. Thus James ('90, 110) has said:

> We notice after exercising our muscles or our brain in a new way, that we can do so no longer at that time, but after a day or two of rest, when we resume the discipline, our increase in skill not seldom surprises us. I have often noticed this in learning a tune, and it has led a German author to say that we learn to swim during the winter and to skate during the summer.

A person learning to ride a bicycle or to drive an automobile appears to be farther along at the beginning of the second practice period than he was at the end of the first, provided the periods are at least some hours apart. Students of difficult material, such as logic and Kant's *Critique of Pure Reason*, have noticed that when they read the material over one day, getting almost no meaning and doing little more than becoming ac-

quainted with the vocabulary, they can follow the thought with little difficulty the next day, a thing that they could not have done in a second reading immediately following the first. Wise students thus appear to be able to start the learning process in the evening and then let it proceed while they are asleep!

The fact of gain in proficiency between practice periods appears to be unquestioned, but the explanation of it is not clear. James implied that recovery from fatigue was one factor involved and he approvingly quotes Carpenter to the effect that "our nervous system grows to the modes in which it has been exercised" ('90, 112). This explanation strikes Sandiford ('28, 239) as being "contrary to common sense as well as to the law of exercise," although he presents no evidence for his position, but Fox ('28, 176), who views the matter from the standpoint of *gestalt* psychology, does not find it unreasonable and says: "During such intervals some change is going on in the unconscious mind whereby a better organization of our experiences is assured and they are more firmly knit into the fabric of our mental life." Thorndike ('13, 301) attributes the gain to (1) recovery from fatigue, (2) recovery of interest, and (3) the dropping out of undesirable (superfluous and interfering) bonds, which weaken more rapidly with disuse than those that are directly needed and more specifically exercised.

Whatever the explanation — and more experimental work is obviously needed — we have here a phenomenon that both teachers and pupils may well bear in mind. Difficult tasks may to advantage be attacked at intervals rather than in one continuous siege. Much discouragement may thus be avoided with the confident expectation that the matter will clear up on the next day, or the next.

13. *Memorizing.* The memorizing of long selections of prose and poetry is no longer extensively required in our schools,

but when it is required it might as well be done intelligently. The first requirement is to *teach* the selection. This means that the student should get a meaningful conception of it as a whole. His interest should be stirred by its value and his esthetic sense thrilled by its beauty. All this should be done *before* memorizing is even suggested. Understanding and enjoying the selection is half the battle; all that is left to do is to memorize the words, many of which are already indelibly interwoven with the conception.

In the process of memorizing, most persons, adults as well as children, proceed by breaking the selection up into parts of two to four lines each and memorizing them separately. As each section is memorized, they usually go back over the preceding sections to weld them all into a unit. This obviously tends to give the earlier sections much more attention than the later ones.

Psychological experimentation, which has been rather extensive in this field, has demonstrated that this common practice is not the most economical. Most, although not all, of these experiments have shown that it is more economical to memorize by wholes than by parts. Instead of rehearsing a few lines or sentences until they can be repeated from memory, go over the selection as a whole until it is known. Selections ranging from a few lines to 240 lines in length have been tried and the principle has been found to hold for all. Pyle and Snyder (*J. E. P.* II, 141. 1911), in an extensive experiment with selections from Longfellow's translation of Dante's *Divine Comedy*, found that there is a saving of about eleven per cent in units of from twenty to fifty lines in length, and twenty per cent in longer units, this saving holding about equally for both time and number of repetitions required for learning.

Experiments reported by Meumann ('13, 248) indicate that the superiority of memorizing by wholes holds also for children

and for such incoherent material as names, dates, and words from a foreign language. Yet he reports "that in the child's mechanical learning, the part-procedure at first leads more rapidly to the goal than the whole-procedure. This is due to the fact that the child finds the whole-procedure displeasing and discouraging at first because he feels that he is making no progress."

The intense effort that counts in fixing an act of skill counts also in memorizing. Smith and McDougal (*Brit. J. of Psy.*, X, '19–'20) found that it took about ten times as many repetitions to learn a list of nonsense syllables in a passive attitude as it did in an active attitude, and that these syllables were retained far better when learned in an active attitude.

In the process of memorizing it has been shown that the method of recall is most effective. This consists of closing the book or looking off the page as soon as possible and recalling consecutively what has been studied. This aids in concentrating attention, in revealing the points that need extra drill, and in avoiding superfluous repetition.

14. *Avoiding exceptions.* James ('90, I, 123) says: "Never suffer an exception to occur till the new habit is securely rooted in your life." To assent to this admonition is easy enough, but it is also easy to see that the complexities of the life of the child in the home, street, and school make it very difficult of realization. What we must do is to build up the child's own sense of responsibility in the matter. He must not only be willing to coöperate in the presence of the teacher, but he must be willing to assume his own guardianship when away from the teacher. In this the German schoolmaster appears to be highly successful. The excellent German that is spoken even by graduates of the common school has often been noted by foreign visitors. For this the schoolmaster is primarily responsible, but not merely because he absolutely refuses to

accept an ungrammatical recitation. He succeeds also in getting the children to appreciate the cultural importance of correct expression.

Should we interrupt a recitation in history or geography in order to correct an expression in language? Not in order to correct every little slip, but certainly to safeguard expressions that have recently been given special attention. Unless this is done our efforts in the language class will be quite unavailing. But interruption is too strong a term here. The tactful teacher can direct the pupil's attention to the error and can get him to go over the expression correctly without interfering materially with the recitation.

A valuable lesson in this connection may be learned by teachers from trainers of animals. These trainers have learned from experience that they must be absolutely undeviating, for unless they are their animals are of no further use to them. A dog that has once been let off after evading a high jump is made entirely unreliable thereby. He may in training attempt to evade the jump, but if this evasion is not accepted, if he is then and there compelled to go through with the jump, he soon learns better than to try evasion. A horse is made unreliable for life by being allowed to run away just once.

15. *Displacing wrong habits.* Avoiding exceptions in building up a new habit may be difficult, but displacing an inferior habit by a better one is even more difficult. The reason for this is that habits function unconsciously. Mere intention will not do the trick. Unless one remains continuously on guard till the better habit is well ingrained, the established habit will function. This means that one must learn all over again, and with greater concentration of consciousness than was needed in starting habits anew. For a time, often for a long time, one will be all at sea.

With the exception of finding the task more difficult,

the principles underlying the displacing of inferior habits are the same as those underlying all habituation. To begin with, the whole situation must be brought to clear consciousness and the new habit in particular must be focalized. Next, purpose, motive, and a sense of value for the new must be developed; the change must be recognized as eminently worth while. This must be followed by drill in attention, and consciousness must remain on guard until the new habit is sufficiently strong to compete successfully with the old. Every outbreak of the old form must be rigorously checked and the new form substituted. In language forms, as pointed out in the preceding section, this may be done quietly and without serious interruption. With young children whose language is still plastic, a wrong form may usually be adequately corrected by merely suggesting the right form and getting them to use it.

Rightly or wrongly, the primal index of culture is generally taken to be a correct and easy use of the mother tongue. When we hear a person of supposed culture, such as a college graduate, mispronounce common words or speak ungrammatically, we at once conclude that there must be something wrong with his training, his breeding, or his capacity. With teachers the matter even assumes great practical importance. School officers and parents, although they may themselves be lacking, are keenly critical of the language that teachers use, for they think, and rightly, that pupils in school, if anywhere, should be under unimpeachable influences.

Correctness of speech, like many other refinements of personality, comes only through persistent and painstaking self-discipline. In view of this fact the conclusion that there must be something fundamentally lacking in the person who has had educational opportunities, but who is still characterized by slovenly habits of speech, has much in its favor.

16. *Summary.* The appropriate exercise for automatizing

motor responses is the drill exercise. The development of an act through drill must precede its application in practical situations, especially where good form and hierarchies of habit are largely involved; less so where technical skill is the predominant feature. Motive is important, but presents no special problems. It is aided by definiteness of goal and by working against time. For best results, practice periods need to be relatively short and properly spaced. In memorizing, the whole method is superior to the part method. Undeviating correctness in practice and thoroughness on basic processes are the price of ultimate expertness. Displacing inferior habits is difficult and presents a challenge to character.

EXERCISES

1. Should the elements in penmanship, the strokes and letters, be developed *before* use in practical writing?
2. Do you see any reasons why children before the age of about eighteen should be allowed much leeway in the language they use?
3. Under what conditions may false syntax and other false forms be used in teaching? Under what conditions may they do harm?
4. What evidence, if any, does Sandiford ('28, 240) offer for the statement: "There is no consolidation of practice effects during the interval of no practice"?
5. Point out somewhat fully the elements involved in various technical skills, such as painting a portrait, making a cabinet, and building a stone wall.
6. Point out that sequential thoroughness holds not only in telegraphy and typewriting but also in mathematics and logic. Does it hold in other subjects? Explain.
7. Do you see any reason why learning poetry by wholes should be more economical than by parts? (See Sandiford, '28, 227.) Point out the bearing of *gestalt* on this question.
8. It has often been noted that teachers of public speaking themselves speak unnaturally when giving an address and that many

teachers of singing sing unnaturally. Why is this and what is the remedy, if any?

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CHAPTER XIV

FIXING KNOWLEDGE AND APPRECIATION

1. *Use supersedes drill.* It was brought out in the preceding chapter that the procedures appropriate for fixing the various outcomes of learning are not alike. It was noted that drill is the appropriate procedure in the motor field, where precise and uniform acts of skill are desired, and that use or application is the appropriate means for fixing knowledge, attitudes, and tastes. The latter conception needs now to be elaborated. Knowledge has already been divided into particular and general, with further subdivisions under each of these, and we have in addition the social and religious attitudes and the esthetic tastes. Is use equally suitable in all of these? Broadly speaking, yes, yet there are variations significant enough to be noted.

2. *Mastering generalizations.* Use as a means of clarifying and impressing knowledge is most easily exemplified in teaching relationships or generalizations. It will be remembered that the last step or phase of the outline for inductive teaching is labeled "application." When a generalization has been developed, it needs to be used or applied in order to make its meaning clear and to give the learner a sense of mastery over it. Drill, properly defined, would obviously be unsuitable. One might memorize the wording of the generalization, but that would not insure mastery, and it would be senseless to work the same problem over and over again. Yet these are the only ways in which drill could be applied here.

What is needed in mastering generalizations is not uniform repetitions, but application in varied and meaningful situations. After the teacher has developed the definition of an ad-

verb in grammar, he lets the pupils pick out adverbs from sentences. Similarly, in arithmetic, after the teacher has developed the rule for long division or for extracting the square root, he lets the pupils use this rule by solving a variety of problems. Only in this way are generalizations genuinely mastered, provided always that the problems to which the generalizations are applied are meaningful, i.e., are understood. If they are not understood, only a parrot-like procedure, and not insight, results.

3. *Application exercises.* Writers of textbooks recognize the function of use in fixing knowledge by including application exercises in their books. Such exercises are now found in most textbooks dealing with expository subjects. Textbooks in arithmetic and algebra are composed mainly of problems that call for the reflective use of the rules or principles that have been developed, but similar problems are found also at the close of chapters in books on physics, chemistry, logic, economics, psychology, education, and other subjects.

Application exercises may be divided into two classes, (1) real, and (2) artificial. Those referred to in the preceding paragraph are all artificial because they are all made to order for the express purpose of clarifying, impressing, and giving control over generalizations.

Real exercises are adequately defined by the term itself. They are real in the sense that they call for the use of generalizations in solving problems that are of actual moment in life. A pupil that is helping the teacher with the records of the school is handling real problems. The use of the principles learned in geography, history, and civics in interpreting current events is real. Pupils making use of the rules of grammar in improving their own language are making practical use of their knowledge. To be real a problem must be actual to the person who faces it.

Real problems are distinctly more effective in eliciting purpose and interest than artificial problems, but such problems are not extensively available in general education. The real problems involving mathematics, grammar, the natural and the social sciences that the student faces are not numerous and varied enough to meet the needs of education. They must be generously supplemented by artificial problems.

Artificial problems may be further divided into (1) abstract, and (2) concrete.

$$6498 \times 73 = ?, \text{ and } 4 \times 6 \div 3 + 7 \div 5 \times 5 = ?$$

are abstract. Formal or symbolic would also describe them. What would 25 bushels of potatoes cost at 65¢ a bushel? is concrete.

The function of abstract and of concrete problems in teaching is not the same. When mere facility in the application of rules and the manipulation of processes is desired, abstract problems are sufficient. This type of work has a place in mathematics, in logic, and in the physical sciences, but it should not be expected to yield more than it is qualified to yield. It yields formal expertness, and nothing else. If the subjects studied are also to yield insight into environmental relationships, then concrete problems are needed. Arithmetic beyond the fundamental processes is largely applied economics, and unless it is used to yield insight into actual economic and other practical relationships, its educational opportunity is mainly lost. The tables of denominate numbers deal with realities that should become meaningful. This means that the pupils must actually weigh and measure and solve problems that are met with in the world outside, or that at least closely simulate such problems. The actual problems of housing, foods, clothing, recreation, and the like, all have mathematical aspects that are worth understanding even by children. In

high-school physics and chemistry, formal expertness in problem-solving is of little positive significance (the indications are that it is of negative significance), but problems dealing with the application of the principles of these sciences to actual situations may be highly significant educationally. In order to gain worth-while results, application exercises must be adapted to the realization of specific teaching objectives. To use them primarily as busywork is to do harm rather than good.

4. *Fixing particular knowledge.* The task of fixing particular items of knowledge in a meaningful manner is not as simple as fixing generalizations. In the past, teachers have usually resorted to drill. If, for example, the capes or bays along the eastern shore of North America were to be learned, the pupils were given the task of memorizing them. The states, their capitals, and their leading products were treated in a similar manner. Such teaching requires little training, ingenuity, or understanding on the part of the teacher, and for the pupils it is stupid and quite meaningless.

It is true that we want to know the outstanding land and water forms along the eastern coast of North America, but we want to know only those that play a significant rôle in human affairs, practical or scientific. This being true, we need first of all to teach each feature in a meaningful manner. Cape Cod, for example, as is usually true of capes, is a great obstacle to navigation, and it has been since the beginning of American history. To overcome this obstacle, a canal has been built to connect Buzzard's Bay with Barnstable Bay. Agitation for this canal dates from the seventeenth century, but it was not started till 1909 and it was not completed till 1914. The inhabitants of the cape, or peninsula as it really is, gain their living mostly from the sea. Provincetown at the point of the cape has a good harbor and is a quaint and interesting city. The summer climate of the cape is attractive, which

has led to the building of many summer homes and cottages, despite an overabundance of mosquitoes. If the teacher or any of the pupils have been on Cape Cod, they can supplement the information from books by first-hand experience.

Vital and meaningful teaching will so impress items of information and will so weave them into the general matrix of knowledge that the battle for retention is largely won. The teacher must remember that particular knowledge is seldom isolated knowledge, in school probably never. Isolated knowledge is knowledge not yet understood and is of concern mostly to research scientists. The knowledge that is dealt with in the school has been proved and tested; it has become a part of a coherent system; it is functioning in the life of man; and it is therefore significant and meaningful. The framing of the Constitution of the United States was not merely an interesting event; it was a link in a network of events that can be fully understood only by noting its relation to the events that went before, that were contemporaneous, and that followed. Vital teaching includes the placing of knowledge into system, and this demand increases as we proceed upward beyond the primary grades.

After knowledge has been vitally taught, it needs to be used. The basic facts in geography and history may be frequently reviewed in the study of current events. The students who are reading seriously and intelligently a daily paper and a weekly review are continually re-using their knowledge, not only in geography and history, but in other fields as well. Whenever Lindbergh makes a flight, pupils, under the direction of their teachers, all over the country, are following him with the aid of maps and with descriptions of places from books of reference.

Granted understanding and an intelligent participation in life itself, the facts that one needs will soon become a part of

his equipment. I had this impressed on my mind a few years ago by testing a group of graduate students on their ability to identify the geographical facts given in Rugg and Hockett's *Objective Studies in Map Location*, which we were studying together. Most of their scores approached perfection, and when I inquired if that was the result of having been well drilled in school, they all said "No." "Why, these are the facts that we have been using all our lives," they maintained.

The use of knowledge in interpreting current events and in participating in the cultural life of the race is real, but artificial devices for using knowledge may be resorted to in this field also with good effect. Pupils, for example, may be asked to plan an imaginary trip and tell of the interesting places that they would pass through, or they may be asked to compare in geographical interest the various routes that might be taken in going from Washington to San Francisco. This sets tasks that are both interesting and educative. In arithmetic, games have been devised to get pupils to use their knowledge in interesting ways.

It is one function of books on special method to bring together the devices that have been found useful by teachers in familiarizing their pupils with what has been taught, yet for best results, teachers should go to these books only for suggestions. The ingenuity of the teacher in adapting devices to the demands of his own occasions can never be left out of the equation. The more concrete and real the devices are, the better, because formal devices soon become perfunctory. Projects and activity programs are yielding splendid results in the use of knowledge. This topic will be taken up in Chapter XVIII.

It is clear that the type of teaching here advocated is quite different from that frequently found. Many schools are still fact-grinding machines. This results in part from lack of professional insight on the part of teachers, but it appears to

result even more from our irrational tests and examinations. There is no excuse for the teacher not to improve his own tests, but when tests calling for mere memorized details are set from the outside, the teacher has no choice but to get his class ready for them. State, county, and city-wide tests are no doubt always disturbing in contemplation, but if such tests were constructed with a mind on the type of study that they are likely to stimulate, they might become a means of improving the teaching in the area concerned. The frequent verdict now is that such tests have a formalizing and depressing influence.

5. *Tastes and attitudes.* Appreciation in music, art, and literature may be regarded as having been fixed when the person concerned begins to include these arts in his life; when he attends concerts and musical festivals because he enjoys them, when he visits art galleries because he is attracted by pictures and statues, when he reads classic productions because he gets an inspiration from them that ephemeral productions fail to give.

Fixing esthetic tastes requires little more than it does to develop them, as brought out in Chapters IX and X. All that is required in addition is an abundance of well-planned opportunities to hear music, to see art, and to read literature. For a time these opportunities need to be integrated with the class work and followed under the guidance of the teacher, but later they should branch off into music, art, and literature clubs that are guided by the students themselves. Not all students will go into these clubs and it should not be expected. A few will want to follow all three, some two, some one, and some none. Tastes differ. The student who gets little joy out of the esthetic subjects may get great joy out of the natural sciences, the social sciences, metaphysics, or manual art. Having surveyed the esthetic subjects will for him have been

by no means in vain. He will have the satisfaction of having some insight into these subjects, he will better understand references to them, he will be more sympathetic toward those who do enjoy them, and he will be aware, perhaps humbly, of his own limitations.

It should be noted that drill is entirely out of place in the field of esthetic appreciation. It is even true that formal appreciation exercises are entirely out of place. The development and establishment of these appreciations must follow along lines that are as real as the uses of these appreciations are in life. This makes the direct attack in teaching the only justifiable attack in this field. Music, art, and literature must from the beginning be attacked and followed essentially as they are followed by cultured people beyond the school.

What has just been said about esthetic appreciation applies in principle also to the establishment of wholesome and reliable social attitudes — with one exception. Lack of social sensitivity cannot be compensated for by sensitivity in other directions, as is the case in esthetic sensitivity. No one can escape his social relationships, as he can, in a measure, his esthetic relationships. A person who is obtuse to social values thereby becomes a problem case, in life even more than in school.

In the social field again it should be noted that drill exercises have no place and that the opportunities for conduct must be real. This presents no difficulty, for conduct both in and out of school is real, although it is not always easy for the pupils to see that the demands of the teachers are real and call for the same moral integrity as demands outside. Cheating a customer and cheating in an examination are not always placed in the same category by pupils. The remedy is found in making tests and examinations more natural and real. Tests can be made essentially cheat-proof. See Chapter XXIV.

6. *Summary.* Clear thinking in the use of teaching pro-

cedures requires us to recognize that the outcomes known as knowledge and as appreciations are brought home to automatic mastery, not through drill, but through intelligent use or application. This places a distinctly heavier burden on the teacher's ingenuity and resourcefulness than does the conduct of drill procedures, but the gain in meaningful insight and appreciation makes this added burden amply worth while.

EXERCISES

1. Point out that understanding is needed in abstract, as well as in concrete, problems if mastery is to result.
2. What devices may be resorted to for furthering the use of literature, art, and music by young people in an interesting manner?
3. Point out that real problems, as defined in the text, are more extensively available in manual and vocational subjects than in the academic subjects. Why is this?
4. To what extent are teachers using problems and exercises primarily as busywork? Give specific instances from your own experience. Were you benefited or harmed? If the practice is harmful, why do teachers use it?
5. As a child I learned the multiplication tables by heart as wholes, i.e., by the drill method. For years thereafter, if I wanted to know what 7×8 is, for example, I had to repeat the entire table up to that point. Can the use instead of the drill method be employed here with better results? If so, how?

   Point out that the clock device in practicing multiplication is a formal use device and not a drill device.

CHAPTER XV

THE LEARNING UNIT

1. *Meaningful units.* All through the preceding pages it has been implied that subject-matter must not only be real, but also that it must be significant; that it must in some way be useful in the affairs of life. It is this aspect of education that has in recent years been brought into the pedagogical limelight with new emphasis by Henry C. Morrison, of the University of Chicago, under the designation of *learning units.* Morrison defines a unit as "a comprehensive and significant aspect of the environment, of an organized science, of an art, or of conduct, which being learned results in an adaptation in personality" ('31, 24), and he devotes most of Part III of his book to outlining and discussing the units into which the various school subjects may be divided.

When Morrison enumerated the environment, science, an art, and conduct he related the learning unit to the objectives of teaching as brought out in Chapter III. We have units in the fields of knowledge, of appreciation, and of motor control. Learning to typewrite, to read French, and to manage a lathe are units in the field of motor control; to learn and to enjoy "America the Beautiful," to appreciate the art of Raphael, to get the esthetic and social significance of Tennyson's *Idylls of the King,* and to appropriate into one's personality the conception of the sacredness of private property are units in the field of appreciation; to know the cereal grains and their uses and to understand the theory of evolution are units in the field of knowledge. *A unit is any division of subject-matter, large or small, that, when mastered, gives one an insight into, an appreciation of, or a mastery over, some aspect of life.*

Units are divisions of subject-matter for teaching and learning purposes. We have been dividing subject-matter into units since schools began in ancient times and we shall continue to do so as long as schools last. For this there is an inherent necessity because subject-matter cannot be assimilated all at once; we must divide it in order to conquer it.

Into what units or subdivisions a person will divide any particular school subject depends upon the objective or objectives he is setting out to achieve. If he thinks of geometry primarily as a means of mental discipline, he will do one thing; if he thinks of it as a means of developing certain insights into our environment, he will do another thing. History contains a well-nigh endless array of facts and events which may be used for a variety of different purposes. From the standpoint of the eruditional conception of education, these facts could be grouped so as to facilitate their memorization, and writers might conceivably vie with one another in the memory appeal of their groups. Any of the groups made might be called units. They would not be the units that are suited for the achievement of our present purposes of education, but units, as such, do not determine or define the purposes of education; these purposes determine and define the units. From any standpoint, therefore, we could speak of acceptable or unacceptable, good or poor units, but there is no one type of division that is deserving of being called the orthodox unit.

2. *Units relative.* Morrison applies the term *unit* to the relatively large (comprehensive) subdivisions that correspond either to our traditional parts or to our traditional chapters, and uses the term *element* for a subdivision of this larger unit. These elements are functional aspects in the understanding of the larger unit. The aspects must themselves be understood in relation to the larger problem and to one another in order that the understanding of the whole may emerge. To the

extent that they bring together and unify smaller elements — that is, are comprehensive — they are also logically entitled to the term *unit*. In other words, a unit is not measured by its size, it is not something arbitrary, but is measured by its content and function; by its unifying and interpretive effect. This makes the term relative, much as the term *species* is relative in logic. A species is merely a subdivision of a larger group known as a *genus*, but what is a species in one series may be a genus in the next. Similarly, what is a unit from one standpoint may be an element in a larger unit from another standpoint.

A good example of this relationship is given by Morrison ('31, 233). Gender, number, person, case, and tense may be taken up as units in grammar, but they are not adequately understood unless they are viewed also as elements in the larger unit of "agreement." This unit is "comprehensive" in the sense that it embraces all the others and relates them under one principle. The resulting understanding works in both directions; it interprets more fully the meaning of each element and it enriches the idea of agreement.

This relative aspect in the meaning of unit is well exemplified by a book such as Morrison's. The entire *book* may be looked upon as one unit in the field of teacher-training. This book Morrison divides into four *parts*, each of which may be looked upon as a unit; these parts Morrison divides into from three to seventeen *chapters*, each one of which may again be looked upon as a unit; and these chapters he divides further into *sections* and into *topics*, each of which again may be viewed as a unit. Each one of these subdivisions, we may assume, plays a significant part in establishing Morrison's theme as a whole. Each one of the terms used to designate a subdivision is needed and there is no inherent reason why we should attach to any one a derogatory meaning. To apply the term *unit*

to any one dignifies it by implying that it plays a meaningful and functional part in the whole, but to restrict it to one would be arbitrary.

From the standpoint of a functional conception of education, the units that Morrison presents harmonize very well with what we are now aiming to accomplish in education, but they are not the last word on the subject, and Morrison himself makes no such claim. We shall be experimenting with unit divisions as long as teaching lasts, for there is involved not only the progress in knowledge and educational conceptions, but also a large element of personal taste. A series of units that may be suited to the needs and personality of one teacher may not be suited to those of another. What we must by all means avoid recognizing is a series of approved units. Such a series would put teaching into a strait-jacket. To have committees determine the units in any subjects for the teachers of a city, a county, or a state is of doubtful expediency. To use such units as suggestions would not be objectionable, but to expect teachers to follow them as official pronouncements would be highly objectionable.

3. *Examples of unit divisions.* A typical series of unit divisions in American history is contained in Casner and Gabriel's *Exploring American History* ('31), a text for junior-high-school grades. It is as follows:

I. An awakening old world discovers a strange new world.
II. The English take leadership in North America.
III. The thirteen colonies break with England.
IV. National authority is established.
V. The common man rises to power.
VI. The nation divides and re-unites.
VII. The nation pushes westward.
VIII. The machine changes American ways of living.
IX. The United States becomes a world power of first rank.

These nine major units are divided into twenty-seven subunits or problems, the number under each unit varying from two to five. The problems under Unit IV, National Authority is Established, are:

1. How did the thirteen colonies become a nation?
2. How did the young nation settle and hold its vast western territories?
3. How did the United States become the strong and united nation that could issue the Monroe Doctrine?

A suggestive list of units for plane geometry viewed as an interpretive study is given by Morrison ('31, 247):

I. The angle
II. Parallel lines
III. Perpendicular lines
IV. The triangle as a plane figure
V. Quadrilaterals
VI. The polygon
VII. The circle as a plane figure
VIII. Areas
IX. Loci
X. Proportion as applied to plane figures
XI. Symmetry

This list is suggestive because it implies a treatment of geometry not now prevalent in our high schools. We have here a list of space relations that are worth understanding regardless of the ability to demonstrate theorems. Under each head a few theorems should be given in the teaching to make geometrical procedure meaningful. That is, theorems should be used as assimilative material. As geometry is now generally taught, few students see anything but assimilative material and this means little or nothing to them. One should be able to cover such an interpretive course in one semester, leaving the other semester of the year for a similar functional

and interpretive treatment for algebra. Properly reorganized, even algebra could be made meaningful for high-school students. Betz ('30, 120) has suggested the following units or nodes about which to organize the essentials of algebra:

I. Language and ideas of algebra
II. The equation
III. The formula
IV. The graph
V. Fundamental principles and processes
VI. Problem-solving

4. *Cycles of subject-matter.* Morrison's reference to both environment and organized science in his definition has no direct bearing on the unit itself, but it does have reference to a significant aspect of curriculum construction and arrangement. To this aspect we have had occasion to refer a number of times in the preceding chapters. We referred to it in Chapter I when we pointed out that the first cycle in physics is different from the second cycle, and we referred to it in Chapter XI in connection with the reorganization of the curriculum in the social sciences.

In all content subjects there appear to be three successive cycles of subject-matter from the standpoint of learning procedure. There is, first, the elementary cycle whose function it is to give experiential contacts with the field; next, the secondary cycle whose function it is to give a concrete, connected, and interpretive grasp of the data in the field; and, third, the collegiate cycle whose function is scientific mastery and the ferreting out of relationships.

Biology, for example, would be represented in the first cycle by nature study, in which the children would become acquainted in a direct and friendly manner with the plants and animals in their environment. In the second cycle we would have botany or zoölogy, attacked from the natural history

standpoint. The experiential basis started in the first cycle would be extended, the data would be interpreted with special reference to human needs and culture, and they would be grouped or systematized. The student coming out of this cycle would feel acquainted with the plant or animal life of his environment and he would be ready, if he desired, to proceed into the third cycle and take up such subjects as monocots, dicots, morphology, and ecology, or physiology, histology, and heredity.

In history the function of the elementary cycle is to develop vivid and meaningful pictures of life in former times. The home life, the heroes, and the great happenings form the subject-matter, and activities plus interesting reading the method. The function of the secondary cycle is to develop a connected and interpretive view of social evolution. This is the cycle that is now so much in the limelight. The third cycle leads students into special historical studies, such as Greek history, medieval history, and English history. Beyond the third cycle may always be found the graduate school cycle for research purposes.

5. *Adaptations and assimilative material.* Morrison distinguished between the adaptation that is the outcome of the unit when mastered and the assimilative material that is used for developing this adaptation. One is the end and the other is the means for attaining the end. This distinction is fundamental and needs to be clearly grasped by the teacher in the classroom; not to observe it is to get matters confused in the mind of the learner.

In developing an understanding of the condensation of moisture from the air, as outlined in Chapter IV, the data used — "sweating" of ice-water pitcher, moisture on window-pane, etc. — are the assimilative material and the understanding of the cause of condensation is the adaptation. There is

usually little difficulty in distinguishing assimilative material and adaptation in the natural sciences, but this is not always easy in the humanistic subjects where instances of assimilative material often look like important items in themselves. Is the French Revolution, for example, a unit in general history or is it merely an item of assimilative material in a larger unit?

In gaining an understanding of the transition from medieval autocracy to modern democracy, the French Revolution is only an item of assimilative material, along with the revolutions in England, Italy, Russia, Germany, and Spain, extending from the seventeenth century to the present. It is difficult to see how a war can ever be anything but assimilative material in any course of cultural history, and even then only the causes leading up to the war and the results coming out of the war are concerned. There may be reasons for following the details of a war, but understanding the course of social development is not one of them. In a war college not only a war as a whole, but even a single battle, may be a significant unit in military strategy, but that is an aspect of professional education.

To distinguish between the gist of a unit and the assimilative material, the teacher needs only to have clearly in mind the objective that he is trying to achieve and the means that he is going to use in achieving it. If that fails to bring in certain items of knowledge that he thinks the pupils ought to know, he should still leave them serenely alone. If the pupils really ought to know them, they must be significantly related to some other unit which may be depended upon to gather them up, or they may be left for general reading. To drag them in by the heels anywhere is to clutter things up and to confuse the issue. To omit them sometimes takes courage, especially in relation to the textbook that may be in the hands of the pupils, but if the teacher knows what he is about he should

stick to his convictions and go ahead. Merely learning something is not education.

The distinction between basic adaptations and assimilative material is profoundly related to tests and examinations, but that is a matter we shall take up in Chapter XXIV.

6. *Units and textbooks.* Learning units have been made so much of lately in certain quarters that teachers have gained the impression that our textbooks are inherently and necessarily out of harmony with the proper arrangement of subject-matter and that the only way for the master-teacher to proceed is to use an outline or syllabus (prepared, perhaps, by an orthodox unitarian) and to use a large variety of books and articles as reference material. There is nothing wrong in proceeding in that manner, but what are you going to do after this teacher has written up his material and procedures in the form of a textbook, as some of them have done?

No, textbooks, when properly used, are not inherently out of harmony with wholesome educational conceptions and to follow one is not necessarily evidence of educational incapacity. The beginning teacher can seldom do better than to follow a text, especially if he has had some part in choosing it. Many textbooks are written by persons who have an educational contribution to make and who are well qualified to incorporate this contribution in a well-rounded text. As the teacher gains in experience, in knowledge, and professional insight, he may well become superior to any text and center his work around an outline or syllabus, but even then this is not necessary. He may still feel that he can get the best results by using a published text as the backbone for his course. Another teacher with no more competence or classroom efficiency might feel differently. For him to follow any text might have a deadening influence which might be entirely absent when he followed a syllabus of his own construction. That might give

his personality just the freedom and freshness that it needed, and if it would vivify the teacher's conceptions it would through him vivify also those of the students.

The use of textbooks and reference material is given further consideration in Chapter XVI.

EXERCISES

1. What is the meaning of "comprehensive" in Morrison's definition of a unit?
2. How may the overlapping of units between different subjects be regulated?
3. What is the difference between information and understanding? Give examples.
4. In what sense may the term *topic* have a derogatory meaning? (See Morrison, '31, 195.)
5. Point out the relation of the learning unit to the *gestalt* or pattern in psychology.
6. How much theory or "science" may properly be included in the "natural history" cycle of a subject?
7. "The educational objective at the natural history level is *adjustment*; at the organized science level it is *adjustability*." (Morrison, '31, 181.) Explain.
8. What is meant by stultification in education and what appear to be some of its underlying causes? Point out how the organization of subject-matter in functional cycles will work against stultification.
9. "If the customary test of reliability is applied, namely, would two different investigators find the same set of units, or the same investigator at two different times, then the reliability of any unit organization is very low." (Morrison '31, 26.) Granted. Has this any bearing on the validity of unit organization?

SELECTED READING

Morrison, H. C. *Practice of Teaching in the Secondary School*, 23–31, 180–254.

CHAPTER XVI

BOOKS AND VERBALISM

1. *Sources of information.* The main sources of information open to students are: (1) first-hand experience, such as field and laboratory work; (2) oral language, such as lectures and developmental teaching; and (3) printed material, such as textbooks, treatises, journals, and newspapers. All three have their place in education and there is no question of superiority, for each has its peculiar and indispensable place. They are mutually supplementary.

Printed material is becoming daily of greater importance as a means of disseminating information in life. The daily newspaper is keeping us informed of the march of events the world over and is read by nearly everybody; the weekly reviews are giving us digested, classified, and convenient summaries of events that are widely read; monthly periodicals discuss for the reflective reader the great questions of our time; and books of all descriptions are pouring from our presses to meet all varieties of demand. It is one of the functions of the school to prepare the rising generation for the intelligent use of all of this material.

2. *The textbook.* Printed material occupies a large place in school in the form of textbooks, reference books, and periodicals. American teachers make much use of textbooks, and when this is done intelligently nothing but good need result. It is the textbook that for most teachers, especially in elementary and secondary schools, gives the skeleton to their courses. This skeleton, it is true, needs to be supplemented so as to supply it with flesh and blood, but without the skeleton this flesh and blood would be without form or function.

The textbook, furthermore, is adapted to the mental and educational status of the pupil; it is comprehensive, presenting a rounded conception of the entire subject; it is systematic, bringing into relief the fundamental relationships, and it is convenient in size, making it easily accessible for study at all times and places.

The last point mentioned may prove to be a disadvantage as well as an advantage, for whenever the textbook and the teacher differ, the text usually wins out in the finals. When this is the case, it is an indication that the book has been thrown out of focus in the students' minds in relation to the subject-matter. The teacher needs to make it clear to the students that they are not studying a book, but a subject. The distinction is fundamental. The subject-matter, basically, is not in the book, but in the world outside, and the text is only one of the means of introducing the students to it. Recall at this point the nature of subject-matter and the guide-book function of the text, as brought out in Chapter I. No matter if a text is pretty closely followed, secondary-school students should still keep notebooks, which for them represent the court of last appeal on all disputed points. The teacher should see to it that all conclusions are thoroughly grounded in fact. If the evidence is not conclusive, that, too, should be clearly recognized. Not everything is as yet known or understood, and for the pupil, even in the upper elementary grades, to discover this is wholesome.

3. *Selection of textbooks.* Much has been made in recent years of the careful selection of textbooks. Check lists (see exercises 6 and 7 at the end of the chapter) have been worked out whose function it is to assist teachers in determining the strong and weak points of specific books. As yet these lists are too general, for each is intended to apply to all types of subject-matter, which is an impossible assignment. We need

separate check lists, not only for each subject, but for each subject in each major division of the school system. We need the criteria in each field for good elementary-school texts, good secondary-school texts, and good college texts. In the present chaotic state of curriculum theory we are hardly ready to make use of such criteria. What is a secondary-school subject, and how does it differ from a college subject?

As yet we are not ready to limit the characteristics of good textbooks very closely. There are several types of educational philosophy, and a book that may be good from the standpoint of one may not be acceptable from that of another. A strong argument could be made for the position that textbooks should supply data and little else. This would give the teacher a free opportunity to supply or develop the meaning and system. Master-teachers are doing this, anyway, no matter what the textbook contains.

The fact that points of view in education differ, and always will differ so long as this world is moving forward, indicates that every teacher in every division of our school system should enjoy practically unlimited freedom in selecting his own texts. This is essential for maximum vitality of instruction and for the professional status of the teacher. In many places we are, no doubt, very close to this position. The authorities in states and cities usually approve a number of texts in each field, from which teachers may choose. In colleges teachers, as a rule, are entirely free.

4. *The readable textbook.* What has been said so far applies to the subject-matter that should be contained in textbooks. When it comes to the way this subject-matter is put up, there is much less room for divergence. This is primarily a question of good English and includes such aspects as stirring narration, vivid description, clear exposition, appropriate and progressive vocabulary, and direct attack. Accuracy of treatment, ade-

quacy of treatment, number and appropriateness of illustrations, maps, and diagrams, size of type, length of line, leading, and size of page are also significant factors to note. The way textbooks are put up often makes them much harder to read than is necessary.

When the majority of a class finds it difficult to make out what a textbook, supposedly intended for the course, means, the fault is that of the author and not that of the students. Exposition is an art that not all writers of high-school and college texts have mastered. They fail to make a direct attack on their subject, they fail to state clearly just what the topic or problem at issue is, they fail to give examples of what they are talking about, they fail to come to any clear-cut conclusion, and they are often meandering and verbose, as if the writers themselves didn't know where they were going. All these characteristics are also the characteristics of teaching; in fact the writer of a textbook is a teacher. An indirect attack through definitions and other abstractions is just as deadening in a textbook as it is in teaching; clear-cut instances need to be brought up by the text no less than by the teacher and pupils, and so on for each of the other characteristics. These characteristics of a textbook can usually be judged by reading only a little way into it.

5. *Reference reading.* For the purpose of gaining range in assimilative material and for some diversity in the interpretation of this material, students need to be directed to reference reading in nearly all subjects. Mathematics comes the nearest to not requiring a reference library, except for highly advanced students, yet even here the study of two texts may yield comparisons that are illuminating. This is certainly true in physics, chemistry, and the other natural sciences. As a student in high school I discovered that when our text in physics failed to make a topic clear, the reading of another text

usually cleared it up instantly. Whenever possible, students should follow at least two texts. These not only supplement one another, but even the reading of the same material in different words is broadening; it helps to separate the content from one fixed mode of wording.

Whenever reference reading is required, the teacher should make sure (*a*) that the books needed are in the schoolroom or have been reserved in the library, (*b*) that there are enough copies to supply the needs of the class, (*c*) that the full names of the authors and texts are given and that assignments are made very specific, and (*d*) that the pupils have questions in mind that are to be answered by their reading. These points are all simple and self-explanatory, yet they are frequently violated with a corresponding waste of time. References that should be reported in class should be specifically assigned beforehand to certain students with that purpose.

While a certain amount of reference reading is fundamental, in an introductory course this may easily be overdone. This happens with special frequency in history, literature, and education. What a student in an introductory course needs primarily to get is a clear-cut, backbone conception of the course. He should come away with a few basic conceptions well established and well systematized. A wide and miscellaneous reading is almost sure to swamp such an outcome and leave a student at sea. Reading, to be effective, must be done for a specific purpose, such as writing a paper on a clearly defined topic or preparing an assignment. Too many teachers use reference material primarily for making their courses hard, and so, in their estimation, respectable. It can't be denied that this makes the courses time-consuming, but it also tends to make them non-educative. The reference material merely serves as busywork; it ties up to nothing and so crystallizes into nothing.

6. *Note-taking.* The requirement of blind or bulk reference reading, prevalent in so many college classes and in some high-school classes, makes it necessary for the student to take notes for the teacher, and for the teacher to consume much time to check up on the honesty of the notes. This is not education. Except in laboratory courses, it is doubtful that a student should ever be required to keep notes of any kind, except for himself. To keep notes for someone else, either on readings or lectures, makes note-taking extraneous and causes it to interfere with assimilation. It causes the student to read or to listen for what someone else may want instead of for what he wants and needs. This divides his attention and destroys the proper attitude toward the work.

A teacher who requires the taking of notes by his students thereby confesses professional bankruptcy. If a written record must be left, this may be obtained in response to significant questions, problems, or papers that have been assigned. Only on that basis is the reading likely to be discriminating and reflective and to lead to assimilation.

In advanced courses a wider reading may be undertaken with profit, for the student now has an apperceptive basis for it. Yet even here the student is greatly helped by specific purposes. He must first be led to see what the issues are in his field and then center his reading about them. Papers and researches naturally set specific problems. Spontaneous reading of a wider character is indicative of an inquiring mind and is likely to lead to something, but forced reading without specific objectives is likely to be blind and fruitless, even for advanced students.

7. *Verbalism.* Good as books are when used intelligently, they will defeat the purposes of education when used unintelligently. Students will sometimes recite the words of the textbook, using even strange and technical words very glibly, but

when pressed for the meaning and for an example of what they are talking about they are lost. This condition is known as *verbalism*. The student has the words, but he has no meaning back of them. The condition is so prevalent that it constitutes one of the major problems of teaching. Unless it is overcome, unless the students are acquiring real and meaningful conceptions back of the words that they are using, they had better be allowed to go hiking or to play on the streets.

To overcome the tendency toward verbalism, teachers must first understand the conditions that bring it about. These appear to be fourfold:

1. The isolation of the school
2. The symbolic state of subject-matter
3. The passivity of the learner in school
4. The limitations of the teacher

It is the function of the school to interpret for the rising generation in a meaningful manner the life and environment about us, but in doing this the school is handicapped from the start by its isolation. Pupils and teachers are housed within the four walls of a building that is often remote from the very things with which the curriculum deals. Obviously this exposes the school to verbalism, yet this isolation is in a large measure unavoidable because systematic education cannot well be carried on without bringing children together in school buildings. The only way to overcome this tendency toward verbalism is to devise ways and means of neutralizing it.

By the symbolic state of subject-matter is meant the fact that the subject-matter that pupils study is embodied in books where it is expressed in words and other symbols. Words, as such, obviously have no meaning; they must acquire meaning, which only the realities of life to which they refer can supply. The isolation of the school often makes it difficult to connect with these realities. Here again we must devise means of over-

coming the limitations of the school. Books cannot be dispensed with; they are the depositories of culture, and their importance in education and in life is daily becoming greater rather than less. They can, however, be used intelligently without harmful effects.

The passivity of the child in school is the result of both the prevalence of books in the learning process and the gathering of children together into classes. These conditions, again, cannot be altogether removed. The systematic knowledge that is needed in modern life requires systematic education, which in turn makes necessary the use of books and the gathering of children into classes. Membership in a class and in a school, furthermore, supplies a significant means of motivation and of training in social living. Yet the baleful effects of these conditions can be, and must be, supplemented and neutralized. Vital learning results only from active responses to meaningful situations and the school that crowds these out is defeating its own purpose.

It is no secret that persons who know little of plant life are attempting to teach botany; that persons who know little of government, of business, and of how the other half lives, are attempting to teach the social sciences; that persons who cannot converse in any language but their own are attempting to teach French; and so on through the list. The limitations of the teacher are by many considered the greatest obstacle in the way of vital instruction. The teacher is the product of the routine of the school and has seldom had contact with any calling except that of student and teacher. Furthermore, in our traditional elementary schools at least, the teacher has to teach so many subjects that he is able to become master of none.

To these four causes of verbalism are sometimes added the harmful effects of our overcrowded curriculum and of the doctrine of formal discipline, but these are not inherent as the

other four are. Only fallacious notions of mental discipline interfere with vital instruction, so that this factor has no excuse for raising its head, and the overcrowding of the curriculum is in essence the result also of a fallacy. It is largely the result of a failure to distinguish between basic adaptations and assimilative material, thus cluttering up the curriculum with material that keeps pupils eternally busy but gets them nowhere.

A better organization of the curriculum and a better academic and professional education of teachers will wipe out the overcrowded curriculum and the baleful influence of formal discipline, but the other four factors cannot be wiped out. They are inherent and cannot be removed once for all. They must be mitigated or neutralized by devices and procedures that require perpetual attention.

8. *Overcoming verbalism.* Ways and means of overcoming the isolation of the school are taken up in the next chapter. In principle the teacher must see to it that the circle of instruction interlocks with life instead of being confined to the schoolroom. Verbalistic instruction is book instruction; it begins and ends with the book. Vital instruction centers on realities and uses the book primarily as a means, much as a guidebook is used in travel. An assignment in biology, in geography, in literature, and in history is never primarily an assignment in the text; it is an assignment on reality, even though this be five thousand miles away or two thousand years in the past. The matter is largely one of attitude and attention. The student must be led to realize that education deals with realities that do exist or that have existed somewhere. China is a country with people, houses, fields, streams, trees, and grass just as the region in which the pupil is living, and adults discussed politics and children played games in ancient Athens as they are doing in Washington, D.C., or in Ithaca, New York, today.

9. *The teacher's equipment.* Among the factors that stimulate and guide the learning process, the teacher stands out as being of unique importance. The pupil is immature, the printed page is symbolic, and appliances are inert. This leaves the teacher as the only wise and responsible factor in the situation. It is the teacher who does or does not guide the circle of instruction through the realities of life; it is the teacher who does or does not inspire the proper use of textbooks; and it is the teacher who does or does not enlist the activity of the pupils. The teacher is the keystone of the arch in teaching. As the teacher, so the school, is trite but true.

The teacher is both a mental and a social engineer. In guiding the learning process he is a practical psychologist and in dealing with the curriculum and its relations to life he is a practical sociologist. The teacher needs a meaningful education and training in both respects. Classroom education is not enough. The teacher above all others must have had first-hand contacts with realities; unless he has had, he is but an example of the blind leading the blind.

The teacher's contact with realities must go distinctly beyond the observation of the realities about which he has studied. He must be a participator in life. It is a great asset in his equipment to have at some time in his life done something besides teaching, and while he is teaching he should be vitally identified with at least one outside activity. This may be political, social, or religious, and in some instances even economic, and need not consume a great deal of time. This gives the teacher a background of experience and a confidence in discussion that enhances his efficiency and engenders respect for his ability.

The academic specialization of teachers has already been discussed in Chapter I, to which the reader is referred. It is not erudition that is wanted, but functional knowledge;

knowledge that rests on and interprets the realities of nature and of man. Once having acquired the functional point of view, the teacher is academically saved. The beginning teacher will still have much to learn (a process, however, that has no end), but he can conquer his field by dividing it. He can center his attention on one phase or subject this year, upon another the next year, and so on until the sense of mastery is attained. This sense of mastery that he is gaining in one subject will spread to the others and vitalize them also.

10. *Platoon organization.* The handicap of being obliged to teach a large variety of subjects, under which the traditional elementary school teacher has been laboring, is being overcome by the introduction of the platoon organization, whose underlying principle is departmentalization. This principle has always been in operation in our colleges and high schools, and with the expansion of the elementary-school curriculum it has in some form become a necessity there also. With the introduction of art, music, literature, nature-study, shop-work, sewing, cooking, and physical culture, in addition to the old-line subjects, the curriculum has moved far beyond the repertoire of one person, and the migrating special teacher has proved to be an economically wasteful and a professionally inefficient way of meeting the situation. The specialization, which the platoon organization provides, is leading to better instruction and, through having a number of teachers, to better personality development for the pupils. Departmentalization gives rise to new administrative and supervisory problems, but these can all be met and greatly enhance the professional status and opportunities of the principal.

When one notes the trend in elementary education as exemplified in such schools as the Lincoln School of Columbia University, the City and Country School of New York, and the Francis W. Parker School of Chicago, one begins to feel that, if

specialization is needed anywhere, it is in the elementary school. The work in eurythmics and physical culture; in creative music; in expression in the fine and manual arts; in English, including composition, reading and literature; in the natural and social sciences, each requires a specialist. The teacher in each field must be both a specialist and an artist. With the opportunity to specialize he may become both.

By observing the principles indicated in this chapter and the two that follow, the textbook may always be a wholesome instrument in teaching and verbalism may be displaced by vital and meaningful conceptions.

EXERCISES

1. Make a list of the school practices that consume much time but yield very little in educational product.
2. Is it wise below the college to base courses entirely on library reading? Why, or why not? How, in your experience, does the practice work in college?
3. When a course is based largely on a textbook, what objections to varying the order of the text do you see? May such variation still be justifiable at times?
4. Examine three textbooks in education and note instances where they observe and where they violate the criteria of good exposition mentioned on page 256. Do you see any reason why some texts cite no examples? To what percentage of writers of books in education would you give a passing mark in composition?
5. Mueller ('28, 105) gives the following purposes of collateral reading. Do they cover the field?
   1. To supplement the text with interesting details and descriptions.
   2. To gain a well-balanced impression of the subject.
   3. To develop a critical attitude toward the material.
   4. To develop the "habit of reference."
   5. To give opportunity and practice in organizing material.

6. Mueller ('28, 92) gives the following criteria for selecting textbooks. Compare with those given by Johnson in Exercise 7.
   1. Is it adapted to the capacity of the pupils?
   2. Is it related to individual and social needs?
   3. Is the subject-matter treated in an illuminating manner?
   4. Is the subject-matter arranged psychologically rather than logically?
   5. Does it give good relative emphasis to topics?
   6. Has it good teaching and learning aids?
7. F. W. Johnson ('25, 104 f) gives the following check list for the selection of high-school textbooks. Read this list over critically, marking with a check those items that seem sound and with a question mark those that seem doubtful. For instance, need all good high-school texts be of recent copyright date? In what fields need this not be true, perhaps?

The Checking List

A. General considerations

1. Do the training and experience of the author qualify him as an authority?
2. Does the reputation of the publisher assure a dependable text?
3. Is the copyright of recent date?
4. Has the text a well-defined point of view in accord with well accented educational aims?
5. Is the style clear, attractive, stimulating, and adapted to the age-level of pupils?

B. Subject-matter

1. Selection
   - *a.* Is the subject-matter of the text adapted to the needs of the community for which the text is to be chosen?
   - *b.* Has the material been selected with due regard to the principle of relative values?
   - *c.* Are there enough details, so chosen as to give meaning to the main topics?
   - *d.* Is there an abundance of material from which selection may be made to meet the needs, capacities, and experiences of individuals and differentiated groups?

2. Organization
   a. Is the material organized with regard to the psychology of the pupil rather than to the logic of the subject?
   b. Is there an intensive treatment of a few main topics rather than an encyclopedic treatment of many?
   c. Is the arrangement of material cumulative in effect and yet independent enough to permit the omission of parts?
   d. Does the book as a whole give a unified impression?

C. Helps and aids to instruction

1. Does the teacher's preface explain the particular point of view of the author and give suggestions for the use of the text?
2. Is there an intimate and provocative introduction for pupils?
3. Is the table of contents full enough to show the outline of the book?
4. Is the index full and so arranged that the material may be easily found?
5. Does the glossary give the meaning and pronunciation of unusual and difficult words?
6. Does the appendix contain adequate drill material, tables, charts, etc.?
7. Are the illustrations, maps, sketches, etc., simple, clear, suitable, and attractive?
8. Are the references definite, annotated, evaluated, adapted to the pupils?
9. Are there pointed and thought-provoking summaries and reviews at the end of each unit?
10. Are there definite and varied study helps?
11. Are there at the end of the book general reviews requiring thought and reorganization of subject-matter?
12. Is there interesting, sufficient, and varied drill material in the chapters as well as in the appendix?

D. Mechanical Make-Up

1. Is the binding durable, flexible, pleasing?
2. Is the paper suitable for cuts as well as for reading without eye-strain?

3. Is the type clear, properly spaced, and of a size that is easily read?
4. Is the material well arranged on the page, with distinct topical headings?
5. Is the whole make-up attractive?

SELECTED READINGS

Burton, W. H. *Nature and Direction of Learning*, 413–429.
Monroe, W. S. *Directed Learning in the High School*, 191–234.
Mueller, A. D. *Teaching in Secondary Schools*, 89–114.
Parker, S. C. *Methods of Teaching in High Schools*, 418–435.
Ruediger, W. C. *Vitalized Teaching*, 1–22.
Stormzand, M. J. *Progressive Methods of Teaching*, 28–67.

CHAPTER XVII

SUPPLEMENTING THE TEXTBOOK

1. *Gaining concreteness.* Good as textbooks are, they are only one of a number of factors that figure in the teaching-learning situation. To neutralize their symbolic character, they must be liberally supplemented in the direction of concreteness. Among the means available for accomplishing this are the following, arranged in the order of their nearness to reality.

2. *Observation of reality.* Although school is kept within the four walls of a building, this is no reason why many aspects of reality may not be observed outside the school and why many natural objects may not be brought into the schoolroom for study. We have available (*a*) field trips, (*b*) field assignments, (*c*) recalled experiences, and (*d*) specimens.

Field trips form the most natural means of supplementing the textbook. Many of the things with which textbooks deal may be observed outside of school, and it is no difficult matter to go out and observe them. This holds for both natural and social science. The subject-matter of botany, zoölogy, geology, and physics may be observed all about us, as well as that of government, politics, sociology, commerce, and industry. The facts and phenomena in these fields are so intermingled with one another and are so obscured by familiarity that the child unaided sees little. Elementary-school pupils, especially, need guided observation in this maze of phenomena, but this is true in only a slightly lesser degree for high-school students. If elementary and high-school teachers would look after this matter, the college student might be depended upon to have the desired background, but as it is he seldom does.

Many places are so located that field trips may be undertaken in connection with history and literature. A visit to historic old Concord, Massachusetts, throws a flood of light on the writings of Hawthorne, Emerson, Thoreau, and the Alcotts, and a trip to Mount Vernon, Monticello, or the battlefield of Gettysburg brings the past right back to one. We are here face to face with one of the great educational values of travel. A round-the-world tour ought to be looked upon as being as essential for a teacher of geography as a year's sojourn in France for a teacher of French.

A field trip to be effective must be well planned, to which end the following points may be helpful to the teacher:

(1) The trip should follow, not precede, the study of a topic in class. Only on that basis will a pupil know what to look for.

(2) The teacher must have been over the ground beforehand, perfected all arrangements and located points of interest.

(3) Specific points to be observed and problems to be investigated should be noted by the pupils beforehand. It may be well for pupils to carry notebooks for this purpose.

(4) Care should be taken not to attempt more on one trip than can be thoroughly studied and digested.

(5) The discussion of the points observed should follow as soon as possible upon the completion of the trip.

(6) For passing through buildings and traffic the class should be organized into a company with each member in an assigned place.

(7) Definite signals, such as blasts from a pocket whistle, should have been agreed upon for forming in rank, breaking rank, and for coming together to observe specific points.

(8) The pupils should clearly understand that a field trip is a phase of school work and that order must be maintained.

(9) When the group exceeds fifteen, one or more assistants should accompany the teacher. Teachers-in-training, older

pupils, or representatives of school and home associations may be requested to render this service.

It cannot be denied that field trips consume much time, that they are sometimes difficult to arrange, and that they are occasionally accompanied by risk of injury to the pupils. To circumvent these limitations, *field assignments* may be resorted to. In fact, we have here a pedagogical device of which but few teachers appear to be aware. Instead of taking the entire class to observe botanical, geographical, or other features, the teacher may direct the pupils to observe these things individually. Assignments may be made to them, much as assignments are made to books. These assignments should be discussed in class just as other assignments are discussed.

The writer made use of field assignments extensively while teaching astronomy in high school. It was his idea that students taking astronomy should become familiar with the heavens, that they should learn to know the leading constellations, the conspicuous stars, and the visible planets, and that they should observe their motions. To achieve this end he made assignments to the heavens. Beginning with the region about the North Pole, which many already knew, he sketched on the blackboard what they were to look for, and he requested them to record their observations in permanent notebooks. They were permitted to make their observations individually or in groups, and the class met together in the evening only once, and that was incidentally on a sleighride. The teacher being along, the members of the class took advantage of the opportunity to ask a number of questions. Difficulties met with in individual observations were brought up for discussion in class from day to day. The results were so encouraging that the writer has since tried the same experiments with elementary-school classes, even as low as the third grade, with nearly equal success. The writer found most helpful in this work the

star maps contained in Eliza Bowen's *Astronomy by Observation*, published by the American Book Company.

Many children have traveled and all have had experiences with the physical, biological, and social aspects of their environment. Some of these experiences have been exceptional, but any of them may be, and are, used in connection with school work. A child that has been to other states, to Europe, or to South America is pleased to share his experiences with the other members of the class. Teachers are very generally taking advantage of such *recalled experiences*.

If the three preceding factors may be spoken of as observing real things in their natural setting, the study of *specimens* may be spoken of as observing real things out of their natural setting. We use specimens extensively in teaching botany, zoölogy, physiology, and mineralogy, and there is good reason to speak of the phenomena observed in physics, chemistry, and psychology as specimens. That is, specimens may be either *things*, such as bugs and minerals, or *phenomena*, such as light and consciousness. Phenomena are exhibited by means of experiments, which isolate instances of causal change and bring them before the class for study. Their manifestation is transitory and they must be repeated for successive observations.

Tangible specimens, or things, may be helpfully divided into *temporary* and *permanent*. A temporary specimen is one that is used up in study, such as a flower in botany or a grasshopper in zoölogy, while a permanent specimen is one that may be observed many times, such as grains, minerals, and stuffed animals. Both have their place in the teaching process. Temporary specimens comprise the material for laboratory work in botany and zoölogy, while permanent specimens find some place in the teaching of nearly all subjects.

The logical place for depositing permanent specimens is the *school museum*. This is an adjunct of the school that has re-

ceived far less attention in America than its importance requires. In the elementary school its importance is fully equal to that of the library and in the high school it is not far behind. In Germany and France school museums have long held an assured place, and this appears to be true in other European countries.

I have noticed that school museums are beginning to develop in platoon schools, and to some extent in junior high schools. This gives us a clue as to why the museum has made so little progress in this country. There is in the traditional elementary school no one to look after it, and there is no place to put it. In the new organization we have the science teacher in whose province the museum centers, and we have the science room where it is logically at home. Yet the museum must not be looked upon as belonging to the science teacher and to the science room. It is the property of the whole school and all the teachers must have access to it. Teachers of history, English, arithmetic, art, and home economics, all need specimens to make their work meaningful. Geography, which requires an abundance of material, should, whenever possible, be taught by the science teacher.

The school museums that have developed in this country may be divided into two classes, the *individual museum*, designed for one school building, and the *central museum*, designed for a school system.

The central museum has in America had its greatest development in St. Louis. This museum was started at the close of the Louisiana Purchase Exposition in 1904 by Superintendent F. L. Soldan and Assistant Superintendent C. G. Rathman who saw the educational opportunity presented by exhibits at the exposition. Through the initiative of these men, many of the exhibitors from at home and abroad donated their exhibits and others were purchased by the Board of Education. The

museum is still growing, both by gift and by purchase, and now crowds the capacity of a twenty-four-room building. Two trucks are continuously occupied in serving the schools.

The development of an individual school museum is interestingly described by Arthur C. Perry in Chapter VII of his *Problems of the Elementary School.* Mr. Perry did what so many teachers do, picked up specimens as he went about in the summer, in the hope of using them in his classes. For want of a better place to keep them, he placed them on shelves in his office. From this grew in a few years an extensive museum to which not only the teachers, but also the pupils, contributed specimens. A label was devised which contained, among other things, a place for the name of the donor. This in itself made donating interesting. Things that are junk in the home may be specimens of value in school.

Specimens of all available kinds should find a place in the museum. Manufactured articles as well as objects of nature should be included. Especially should the common grains, vegetables, tools, and instruments not be overlooked. Children read about and talk about these things every day, but they don't know them when they see them. A few years ago I visited the grain exhibit of a county fair with a fourteen-year-old high-school girl. There were specimens of wheat, rye, oats, barley, clover seed, and buckwheat. I asked the girl which of these she knew, and she didn't know a single one. I have since tested city school teachers on these grains, and it is seldom that one finds one who knows them all; most of them know only one or two. Even the knowledge of our teachers is largely verbalistic.

While visiting a sixth-grade geography class some years ago, the lesson happened to be on the industrial region about Birmingham, Alabama. A child handed me a textbook, which, I noticed, contained a list of twelve or fifteen products found

or manufactured in that region. A child called upon to recite gave that list almost *verbatim*. The teacher started to pass right on to another topic, but I requested permission to ask a question. Among the things mentioned were corrugated iron and zinc and I asked the children if they knew what these things were. Out of a class of thirty-five, two knew what corrugated iron was and two knew what zinc was. I didn't ask the teacher. How easy it would have been to bring these things, and others, to the class if there had been a school museum in the building.

The museum, like the library, must be placed under the responsible care of one person. This should be a person deeply interested in the task, who should then be allowed some time from teaching for this work. Some of the older pupils may act as assistants. The teacher in charge should address the staff of the school at least once a year on what the museum contains and on how to use it. For want of initiative, or something, many teachers will not use specimens even when they are near at hand. A verbalistic routine seems to be quite sufficient for them.

Closely allied to the school museum are greenhouses, botanical gardens, zoölogical parks, and general museums, which, wherever found, may also be used effectively for teaching purposes. It will usually require a field trip to visit one.

3. *Models*. Under the head of models should be placed such things as globes, relief maps, and models of the eye, ear, heart, and brain, useful in physiology. For teaching purposes these are often more serviceable than the objects themselves. They are of a size most suitable for handling, they are made so as to exhibit effectively specific points to be observed, and, in anatomy, they are firmer and less repulsive than the organs themselves.

Their firmness and attractiveness give models a high place

in physiology and hygiene in elementary and high schools. They are found useful even in college classes in zoölogy and in medical schools, although there the basic work must be centered on the realities themselves.

4. *Pictures.* Pictures have achieved a large and an assured place in the teaching-learning process. It is a common experience on entering a schoolroom to find pictures pertaining to the topic under discussion arranged along the sills of the blackboards or fastened to the walls of the room. These pictures are used to yield information as well as the text. The children study them both during school time and at intermissions, and they are discussed in the class period. This is done most frequently in geography, but less frequently also in history, reading, nature study, and other subjects.

Pictures available for teaching purposes may be divided into two classes: (1) those suitable for class observation, and (2) those restricted by their size to individual study. Under the first head we have wall pictures, projectoscopic and stereopticon views, motion pictures, and sound pictures; under the second, pictures in textbooks, picture postcards, books of views, photographs, and stereographs.

With the development of motion pictures, visual aids in education were developed into a fad under the illogical designation of "visual education," for which extravagant claims were made. Some even predicted that textbooks would soon be superseded altogether.

To test out these claims and to determine the place and relative effectiveness of the various aids in teaching, there was carried on during 1922–24 an extensive series of experiments under the direction of Professor Freeman ('24), of the University of Chicago, aided by a grant from the Commonwealth Fund. Fourteen persons, outside of teachers and school officials, took part in the experiments which covered topics in

history, geography, geology, nature study, sanitation, agriculture, irrigation, lumbering, transportation, Yellowstone Park, the eye, iron and steel industry, handwriting, milk as a food, health, cooking, manual arts, physics, and foreign language. In some of these fields more than one experiment was tried. The aids tested covered films, slides, stereographs, chalk talks, demonstrations, print, and oral presentation. These were tested sometimes singly and sometimes in combination with others. Control groups were used as checks.

In the experiment with *French Explorations in North America*, film instruction was compared with oral instruction illustrated by classroom maps in the University Elementary School, and in two of the Evanston schools, where three groups of children were used. One was shown the film twice, one was shown the film accompanied by oral instruction, and one was given oral instruction with maps. The abilities of the groups and the periods of instruction were equated and all were given the same tests. The scores achieved were as follows:

	Univ. Elem. School	Central School	Lincoln School
Film	16.5	14.7	20.3
Oral-film		18.4	21.9
Oral-map	16.7	21.4	20.2

These scores are too nearly alike to give an undoubted advantage to any one of the three methods, but this in itself is a significant result. On the whole, oral instruction with maps is more effective than the film in this topic.

The summary and findings cover sixteen pages ('24, 64–80). The outstanding conclusions, given mainly in the words of Freeman, are as follows:

a. In teaching science and how to make something, like a mat or a box, personal demonstration is superior to the film and other pictures.

b. The peculiar value of the film lies in its fitness to furnish a

peculiar type of content of experience, e.g., topics involving motion and change and those in which an introductory survey is helpful for later detailed study.

c. Subject-matter which is not primarily the representation of motion or action should not be included in educational films.

d. It is uneconomical to put into motion pictures actions which can readily be demonstrated by the teacher.

e. Motion pictures should be designed so as to furnish otherwise inaccessible raw material, but should leave the organization of the unit largely to the teacher.

f. It does not appear that motion pictures are of outstanding value as means of awakening interest.

g. Still pictures appear to be very effective as devices in developing the oral use of a foreign language. They give the class something specific to talk about.

h. Each of the common forms of instruction which employ visual aids has some advantage, and there are circumstances under which it is the best form to use.

i. The superior effectiveness of the teacher as contrasted with any merely material device was indicated repeatedly in the investigation. Oral instruction appears to be superior wherever relationships are involved and the pupils have the background of experience. For example, the film entitled *French Explorations in the United States* was not as effective as oral instruction with maps.

It is not to be expected that motion pictures and sound pictures can take the place of well-directed field trips and of masterful demonstrations accompanied by lucid explanations by the teacher, whenever these are available, but they are not always available. When not available, pictures may take their place as the next best thing. For example, in studying the salmon industry or lumbering a motion picture can be used in place of a desirable but impossible field trip. The picture, being readily available, could be used both at the beginning and end of the study, and, if desirable, in between.

The pictures in textbooks are especially deserving of atten-

tion by teachers and pupils. They are put there, not for entertainment, but for serious study. Authors and publishers go to great trouble and expense to obtain suitable pictures and they make their selections with great care. The pictures supplement the written text and are often of equal importance.

Teachers should know that libraries have collections of pictures as well as of books and that these may be drawn as books are drawn. The school museum should contain classified files of pictures to which pupils and teachers should be encouraged to add, and which teachers should use.

Quite as important as the question of getting pictures is the problem of using them effectively. So many are available that teachers often make the mistake of swamping a class. In one class period not more than ten or twelve can, as a rule, be studied to advantage. To bring in fifty is to attenuate proportionately the educational effect. The few that are brought in should be observed with care, not only in the class period, but at other times as well. Pupils should have their attention directed to specific points for study in the assignment.

5. *Maps, charts, and diagrams.* While logically different from pictures, maps, charts, and diagrams are used psychologically just as pictures are used. Their peculiar pedagogical value is found in their schematic nature. A diagram of the dynamo or of the nervous system makes evident to the eye the internal principles of operation as a photograph cannot possibly do, and a map in geography occupies a place all its own. Pictures may be helpful to supplement it and give it fuller meaning, but the map alone can give one a systematic conception of a large area.

6. *Source material.* Source material has a peculiar place in history and geography, but is occasionally helpful also in other subjects. In history we have accounts written by eyewitnesses, laws, charters, inscriptions, and other remains.

There is now no period in history that does not have its source books, carefully compiled by experts, and this includes the histories of education, philosophy, and psychology. Anyone wishing to test the vivifying effect of this type of material should read the accounts of the Jamestown Colony written by John Smith, Edward Wingfield, Raphe Hamor, and others as given on pages 209–46 of Hart's *American History Told by Contemporaries*. These accounts make the trials and tribulations of the colonists fairly live before one.

In geography we have books of travel and many current articles, especially those appearing in the standard geographical journals. These articles are, as a rule, profusely illustrated with photographic views. Geographical readers are written in the main on the basis of direct experience. This material may do for geography what historical sources are doing for history.

In using source material a distinction should be made between using it as a basis for original investigations and using it to supplement and vitalize the textbook. The second only concerns us here, for the first belongs to the graduate school and to the specialist. As a means of supplementing the text, source material occupies a place, especially in history and geography, that no teacher can afford to overlook.

We started out in this chapter with the idea of supplementing the textbook and we are now back again to the textbook and other second-hand accounts in the series of teaching aids, but as the place and importance of these aids was brought out in the preceding chapter, it need not detain us again here.

7. *Oral presentation.* The presentation of information by language may be oral as well as written. In life oral speech occupies an important and fascinating position. Many people will listen with interest to papers, lectures, and sermons, but few will read them when printed. The speaker who has seen

with his own eyes and heard with his own ears never lacks for an audience, and even second-hand information is to most people more interesting when presented orally than when presented in print. That even children gain information from the spoken word is attested by the saying that little pitchers have big ears.

The vividness and flexibility of the spoken word is distinctly greater than that of the written word, but it labors under the disadvantage of being ephemeral and so cannot be reviewed. Words can be recorded for mechanical reproduction, it is true, but even then the review is not as simple as that of print. Until recent years, the possible audience of the spoken word was much less than that of the written word, but this has been overcome by means of the radio.

Oral language has had a place in education from earliest times to the present. It appears in the school in the form of lectures, developmental teaching, supplementary telling, and informal discussion.

The formal lecture is used extensively in our colleges and universities and to some extent in high schools. All measured researches have shown that the lecture when used exclusively is below the efficiency of assignment and discussion, or of incidental lecturing and discussion, which is essentially the developmental procedure. The reason for this appears to be that the student is not given an adequate opportunity for participation under the lecture method. The lecture method is a typical instance of the "pouring in" process in education. It is impression without expression, which is the other half of the learning process. In an extended array of complex subject-matter, as any high school or college course is supposed to be, the student needs frequent periods of reflection, discussion, reading, and, whenever appropriate, manipulation. On no other basis can adequate assimilation be expected. The

teacher needs periods given freely to a give-and-take discussion in order to maintain his contact with the class. It has taken the specialist many years of reading, research, reflection, and discussion to attain the mastery that he has achieved and he must remember that his students need a similar chance. The lecture method alone, even when supplemented by quizzes, does not give them that chance.

As one of the several means of instruction, however, telling or incidental lecturing deserves a high place. Freeman ('24, 78) found that "the superior effectiveness of the teacher as contrasted with any merely material device was indicated repeatedly in the investigation." The contention of some supervisors that the pupils should do about nine tenths of the talking in the schoolroom is an instance of backing off on the farther side. There are times during activity projects and when reports are being given and discussed when this may be true, but when instruction is going on, when data are being interpreted, the teacher must occupy the center of the stage. The basic question is not, Who does the talking? but, Is the unit in hand being assimilated?

The nature of developmental teaching was indicated in the discussion of inductive and deductive procedures in Chapters IV and V. Teaching of this kind proceeds ahead of textbook assignments and is in place only when relationships are being ferreted out. Data cannot be developed; they can be obtained only through direct experience, through reading, and through oral expression; but once the data are before the class, they may then be reflected upon in relation to specific problems. The guidance of this process by the teacher through questions and suggestions is developmental teaching. When well done, it is an effective procedure.

When a relationship, which is an insight, in such fields as natural science or grammar, has been inductively developed, it

may well be followed by textbook assignments. The pupils are now ready to read with alert and critical intelligence. Discussion should, of course, follow this reading, especially in respect to questions raised by the pupils themselves.

Teachers who make assignments to expository material before developing the outstanding relationships in class must then use the question and discussion method to bring out the various meanings. This procedure may be briefer than the developmental and it may lead to equally effective comprehension, which is, of course, the end to be desired. The two procedures may be combined by making the assignment developmental, bringing out the data and leading up to the problem, but leaving this to be solved through reading. This sets a splendid challenge for the reading.

The radio is at present being experimented with as an aid in teaching and it has already proved itself helpful in school music. What its position in education will be cannot as yet be told.

It used to be the fashion among teachers to decline to tell pupils anything that they could find out from books. There are times, of course, when hunting up a piece of information in books is good training, but in the main this fashion rested on half-baked pedagogy. It was assumed that information gained through the eye possessed a merit above that gained through the ear. This assumption had no foundation in fact. The quickest way is usually the best, especially when the information is needed in order to proceed with a line of thought. To leave the matter over until the next day so that pupils will have time to look it up often kills the interest.

8. *Use of blackboards.* Blackboards are a means both for presenting information on the part of the teacher and for enlisting the activity of pupils in the learning process. Teachers who are in the habit of using the blackboard while teaching

have a distinct advantage. Writing on the blackboard in itself elicits attention; it supplements the impression that is being made through the ear; and it leaves an outline for the work that is being developed. This enables the pupils to see the unit as a whole and to note the relationships that exist.

Freeman's investigation ('24, 19) brought out that the chalk talk is an effective mode of teaching. A teacher that can sketch readily on the blackboard has a valuable teaching aid at his command. Sketches made with different colored crayons are of special interest to children. Training schools for teachers are rendering good service when offering courses in the art of sketching rapidly on the blackboard.

EXERCISES

1. Name five topics with which field assignments could be used to advantage in teaching.
2. Why is it that many teachers make little use of concrete material in their teaching?
3. Write a brief account of your experience with the lecture method from the student's standpoint.
4. Make a list of fifty articles that a school museum should contain. How may these be obtained?
5. Name five subjects in which pictures are necessary or helpful. Three in which they are not needed.
6. Give arguments for and against permitting children (*a*) to view, (*b*) to handle specimens in the school museum.
7. What experiments in education by radio are being tried? Mention points where you think the radio may supplement the teacher.
8. Write up briefly a successful field trip in which you have participated. Mention three instances where field trips would have been helpful but were not undertaken.
9. What were the teaching methods used by the Jewish prophets, the sophists, Socrates, Plato, Aristotle, Jesus, Quintilian, Abé-

lard, Comenius, Ezekiel Cheever, Mark Hopkins? Was it method, content, or personality that made these men great as teachers?

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CHAPTER XVIII
ACTIVITIES IN EDUCATION

1. *Learning and participation.* All learning activity is self-activity. This holds in all fields of endeavor — intellectual, emotional, and motor. In the motor field we have the maxims, "Practice makes perfect," and, "Learn to do by doing." One cannot learn to skate without skating or to swim without swimming. A person who knows all about the Binet-Simon tests theoretically will still be awkward and inaccurate in giving them until his skill has been developed by practice.

The first essential in developing esthetic appreciation is participation in esthetic enjoyment. Poetry must be read, songs must be sung, music must be heard, and pictures must be seen. Some experience in writing poetry, composing music, playing an instrument, and painting pictures also furthers understanding and appreciation. Moral appreciation is derived from participation in moral-social situations. The direct attack bases instruction on instances that have been met in the actual course of life, whenever possible in the lives of the students themselves, and then it provides for opportunities in social-moral living.

In the realm of knowledge particular things and phenomena need to be concretely experienced in order to acquire genuine meaning, and all experiencing is active. A ball needs to be seen, handled, and played with; a persimmon needs to be tasted; the whip-poor-will needs to be seen and heard; plants need to be cultivated; pets and other animals need to be handled and cared for; and the phenomena of sound, heat, light, electricity, magnetism, and chemical action need to be observed and experimented with. The manifestations of rela-

tionships need to be seen and the relationships need to be thought through by the students themselves. To know by heart need not be to know at all. Class discussion and developmental teaching demand the active participation of the members of the class. A system of knowledge is not a system for the student until he has thought through it, and in dynamic teaching he thinks it through with the teacher.

Student activity is not restricted to physical activity; emotional and intellectual responses are included as well. Usually all three types are present, but one may be greatly in the ascendancy. A student intently engaged in writing an essay or in solving a problem in geometry, is intensely active, no less than a pupil who is building a doll house or rehearsing a play.

It is in this field of pupil activity that panaceas in method are most frequently offered. Yesterday it was the project curriculum; today it is the activity program. To be under the spell of such educational "ideas" in the activity phase of school work is probably in the main wholesome. Without specific attention to this phase, teaching tends to degenerate into a meaningless routine and learning into a bookish verbalism. Danger enters when the teachers and supervisors become hazy about the real objectives of teaching and think of the activities themselves as the primary ends. The supervisors appear to be more at fault here than the teachers, probably because they feel that their schools must at all hazards be "up to date."

The vital mastery of subject-matter always takes precedence over any particular style of method. The many measured researches that have been carried through on various teaching methods have revealed a startling similarity in respect to their effectiveness, provided the textbook or the recitation is supplemented in some realistic or thought-provoking manner.[1]

[1] See, for example, Freeman, '24; Kiebler and Woody, '23; Lacy, '19; Mead, '27; Philips, '20; Skinner and Rich, '25; Weber, '24; and Wiley, '18.

It is not the method nearly so much as the teacher that counts. A method that may be successful in the hands of one teacher, need not be successful in the hands of another, and *vice versa*. When a teacher is getting results, it is doubtful wisdom to disturb his procedure by expecting him to change to the teaching device of the hour. Devices and procedures are many, but principles are few, and so long as basic principles are being observed, devices are immaterial. The teacher needs first a thorough grounding in basic principles, and second a knowledge of procedures, methods, and devices by which principles may be realized. The principles give criteria by which devices may be evaluated, and without a knowledge of these principles, teachers and supervisors are at the mercy of every wind that blows. They take up every new device as if it completely superseded the procedures of the past and as if it were a panacea that is equally applicable in all subjects.

2. *Activity programs.* The activity curriculum, like her older sister, the project curriculum, is an emanation from our so-called child-centered schools. These schools are both protest schools and experimental schools. They stand in protest against the ever-present tendency toward formalism in teaching and they are at the same time blazing new trails in classroom procedure. The schools of Ratke, Comenius, Basedow, Pestalozzi, and Froebel were all of this type. To them we owe practically everything that is pleasant and effective in our present school practices.

Experimental schools have been with us continuously for centuries, yet it is fair to say that the present interest in these schools dates from the founding of the University Elementary School in Chicago by John Dewey and Mrs. Emmons Blaine in 1896. Dewey gave these schools an improved philosophy based on our increased knowledge of child psychology. Instead of centering the work of the children about reading,

writing, and arithmetic, Dewey based it on "these fourfold interests — the interest in conversation and communication; in inquiry, or finding out things; in making things, or construction; and in artistic expression" ('99, 61). Dewey called these interests "the natural resources, the uninvested capital, upon the exercise of which depends the active growth of the child."

Children cannot indulge these impulses very far without requiring the tools of reading, writing, and arithmetic, and under the guidance of a skillful teacher they soon master these tools, but they master them, not as things apart, but as tools in control of significant conceptions. The heart of primary education is found, not in the mastery of the school arts, but in the understanding and control of the significant conceptions relative to which they are needed. These conceptions must be gained through rich and meaningful living, which it is the function of appropriate activities to supply.

What Dewey did in Chicago may be described as shifting the base of the curriculum from the subject-matter of the textbook to the realities of life; from subject-matter regarded as an end to subject-matter regarded as a means. This shift has not yet been achieved very generally, but, unless signs are misleading, it is proceeding rapidly. The shift will have to be made throughout the curriculum, from the kindergarten to the university. The task is one for teachers, supervisors, and school administrators to achieve, and it is only fair to say that master-teachers, whose number is never large, have always accepted it.

The reason why certain techniques of this philosophy have surged through the traditional schools as fads is because they do not fit the traditional conception of subject-matter and so cannot gain a permanent foothold. They cannot be fully integrated until teachers and school officials realize that

subject-matter centers not in books but in life, that content and purpose are primary and abstractions and techniques secondary, and that the method of direct attack is the only vital method of approach in every field. In bringing about this realization these fads have had some distinctly beneficial effects. They have given the traditional curriculum and its implied procedures in teaching some severe jolts. They have caused teachers to realize that all is not well in our schools and that readjustments are needed somewhere. These readjustments are concerned primarily with subject-matter and method, but because certain forms of school organization make these readjustments easier than others, they are indirectly concerned also with school organization.

This vitalizing, functional philosophy of education can work itself out in the form of a pure activity curriculum only in the first three grades of the elementary school, the cycle traditionally occupied by reading, writing, and number. In this cycle contentful subject-matter in an organized form has not yet appeared. This gives the school an unhampered opportunity to develop in the child a rich background of experience by means of activities. These experiences form the heart of subject-matter for the young child. As this fund of experience increases, it becomes differentiated gradually into subjects, the more the farther we proceed, but this need in no way to interfere with vital instruction. Reading, writing, and the elementary manipulation of quantities may be mastered as needed, but as these have no content of their own they have no right to a central position. This makes the activity program the natural curriculum for the elementary cycle.

A sufficiently large variety of activities have now been worked out so that the elementary cycle of education everywhere could be shifted to the new base, and there is much helpful literature for teachers. Rugg and Shumaker ('28, 78–85)

give in outline form the curricula of the Lincoln School, the Francis W. Parker School, the City and Country School, and the Ojai Valley School. We have space here only for an outline of the first two groups in the Ojai Valley School.

GROUP ONE (ages 6 and 7)

"Their daily life is an active, informal one. They sing, dance, work in the garden, take care of pets, build houses, churn, weave, draw, paint, model in clay, read and write. They listen to stories, learn poems, dramatize and make up their own stories, poems and plays. They keep store, buy and sell the necessary school materials." The experiences and interests with which the children come to school are utilized, organized and built upon.

The children learn to read independently by the end of the second school year and develop a little skill with numbers through their experiences in the room store and bank.

GROUP TWO (ages 8 and 9)

"Our room is like a small town. It has a store, a library, an art gallery, a museum."

The room store produces economic activities. Each child buys all its school supplies, uses checks, keeps records, pays bills, transacts business with the larger general school store.

Library easily accessible for free reading. "Only a few individuals require formal study. The children need mainly to discover that reading is good fun."

"The art gallery keeps always before the children the idea of making pictures." Exhibits are changed almost weekly.

"The museum is an expression of children's tendency to gather things of interest. All of these things suggest group or individual study," such as the study of shells and sea life, of fossils, of spring flowers.

Constructive activities: clay modeling; study of clay methods; history of pottery; study of Grecian sculpture.

Excursions to ships and trains to note cargoes, where they are going and coming from. Ties up with geography.

Expression about all these interests through writing, oral

composition, keeping record books or art forms. Spelling and punctuation are needed.

The actual subject-matter used from year to year must vary to contribute to the particular needs of children for each specific year.

From the foregoing outline one can readily imagine the nature of an activity school. The curricula of the various schools differ in the details, but in principle they are essentially alike. A wholesome child life is provided for. The children are actively engaged in activities that are not only interesting but educative. The school arts assume from the beginning their natural position as means. The activities stimulate a need for them, but these activities are not undertaken as a device for motivating them. One misses the central point of the activity curriculum when he fails to see that these activities actually are a curriculum; that they are eminently worth while in themselves. They not only furnish the basis for a rich and meaningful child life, but they also lead into an understanding of the processes, responsibilities, and opportunities that characterize adult life.

All activity schools emphasize the point that their curricula are in a fluid and evolving state. It is proper to hope that this always will be the case. Once they become fixed, we are back in the formalism whence we started. To maintain vitality, each elementary school must in a large measure carve out its own curriculum, using the curricula of other schools as fruitful suggestions.

In selecting activities, as is always true in selecting subject-matter, teachers must be mindful of the ends that they are trying to achieve. The activities must be chosen so as to lead into an understanding of our social interdependence; of the privileges and duties of the home; of the production, manufacture, exchange, and use of commodities; and of man's

esthetic life in literature, art, music, and rhythmic action. These are the ends of which the teacher needs to be aware; for the child it is all interesting and meaningful participation; for him it is life, a growing and evolving life.

Yet even to the child the curriculum must mean more than entertainment. He must feel that he is making progress, that his insights, appreciations, and skills are increasing, for merely to move in circles is satisfying to no one. The skills that he is acquiring include not only reading, writing, and number, but also drawing, painting, modeling, composing, singing, and dancing.

3. *Emergence of subjects.* An examination of activity school curricula reveals the fact that the traditional school subjects, in title at least, begin to emerge in the fourth grade or at the age of about nine. The curriculum for this period in the Ojai Valley School is as follows:

GROUP THREE (ages 10 and 11)

"These children are a little more conscious of the intellectual content of their work, and this leads to a little more separation of the daily program into definite subjects and the specialization of subject matter." Spend more time to bringing tools to a higher grade of proficiency. Subject-matter and tools only to enrich the present life of the children. Activities in manual and fine arts, excursions, school assemblies and councils, making of collections, continue and are fundamental.

History. Stories of people, how they live and have lived. Story of the earth.

Physical geography. Story of the world, how it came to be, what it is now; winds, currents, rainfall, population, trade, industry, migration, sun, moon, stars, planets, etc. Specially emphasize social geography: the customs, habits, and living conditions of people of other countries. For example, relive the lives of discoverers, explorers, colonists, etc.

Science. Familiarity with local types of wild life — flowers, leaves, ferns; care of neighboring apiary; raise silkworms, col-

lect caterpillars, and study transformation; watch nest of ants under glass; care for pets such as rabbits, mice, lizards, etc.

Group store. Conducted in same manner as in Group Two. Daily needs for number and special help on long division, fractions, decimals.

Library. For information and enjoyment. Make plays of Robin Hood tales and ballads. Nature literature of Fabre, Beebe, Muir, etc.

Writing for school paper. Illustrating with linoleum blocks. Loose-leaf notebooks kept in history, nature study, and group reading. Maps, diagrams, charts made as needed.

Activities. Activities in shop, playground, music room, assembly; special study of drawing and painting all help to meet needs of children.

It is clear from this outline that history, geography, elementary science, arithmetic, literature, composition, and manual arts are beginning to receive attention as subjects. This is true also in the curricula of other activity schools. This need not be disturbing, for it does not indicate an abandonment of the activity principle in education. Activities are still dominant in every item, not only in the last where the name specifically appears.

To assume that the activity principle implies the abolition of subjects beyond the primary grades is unwarranted. In the first three grades, subject-matter is implicit, but once the school arts have been acquired it becomes explicit. The child now has the tools for going after experiences vicariously, but the field is too large to be handled as one unorganized mass; it must be divided in some manner so as to become manageable. Historically our subjects were formed quite spontaneously; they are merely the natural groupings of experiences on the basis of their similarity. With the child, similar groupings must be made, if only for reasons of expediency. The tree of knowledge for him, as was true of the race, is beginning to

branch. The number of branches need at first not be large, but not to recognize any can now lead only to a conglomerate confusion. Furthermore, we must not forget that these branches have content, the very content toward which the earlier activities were leading. So, in the line of natural succession, they become the cores for further activities. To attempt to abolish them is on a par with the attempt to stop the process of evolutionary development. They cannot be abolished, but they can be made meaningful.

Because of the barren and formal manner in which subjects of study have frequently been handled by teachers, it is not difficult to see why prejudices have developed against them in certain quarters, but it is a little difficult to see why the persons holding these prejudices do not discriminate between the subject-matter, as such, and the procedures by which this subject-matter has been handled. Activities handled in a formal manner would give results equally barren, if not more so. Subjects as formulated in textbooks are nothing less than systematic descriptions and interpretations of the facts and processes of the natural and social environment in which we are living. They present, so far as we now know, the best divisions of the field for the purpose of conquering it. To do this effectively we must learn to look beyond the book to the realities to which it refers, to lead our pupils to attack these realities directly, either in the concrete or through language, and to bring in definitions, techniques, and other abstractions only after a need for them has arisen. Activities of various kinds are absolutely indispensable in this procedure, but between these activities and the definite lines of pursuit indicated by our school subjects there is no inherent incompatibility. In fact, the two are complementary. The subjects as now formulated may need revision, the partitions between them may have to be perforated, but something like them we shall

always have to have as objectives for our activities. There is nothing else.

The recognition of subjects after the primary grades is indicated not only by the unfolding curriculum before the advancing child, but also by the growing nature of the child himself. At about the age of nine the child begins to distinguish between work and play, and the play attitude alone is no longer satisfying to him. He wants to work as well as to play. As he looks about him and notes the activities of adults, he even gets the suspicion that work activities are in the long run more interesting than play activities. He still wants to play at times, it is true, but the introduction of the play attitude into the work period is resented by him as being childish. He is beginning to realize that getting an education is work, often hard work, but he relishes this provided it is meaningful. To keep activities, as activities, in the foreground after the age of nine is ruinous to both the play attitude and the work attitude. Playing at education after that age is neither developmental nor satisfying, however well it may have filled the child's horizon before that age.

A few years ago I chanced to overhear a group of intermediate-grade children discuss their project activities. They had the situation sized up exceptionally well. Inbred courtesy caused them to want their teacher to think that they were interested, but at heart they were not. They felt that the activities were childish and they could not see that they were leading anywhere. Their conversation made it clear, too, that they realized they were in the grip of a fad and they seemed to feel sorry for their teacher. Had they been able to see that they were getting significant experiences in relation to geography, to arithmetic, or to other realities, their judgment would, quite certainly, have been different.

The emergence of the work attitude at the age of about nine

is well known to intermediate-grade teachers and to observant parents. Boys and girls after that age no longer like to play at their school tasks and they enjoy working with their parents and doing tasks that count. About the home the product of the work is usually a sufficient reward; in the school their awareness of growth in knowledge and skill constitutes the reward.

The recognition and pursuit of subjects after the intermediate grades play into the hands of the work attitude and enhance rather than hinder vital procedures in learning. Activities still have a place, but they must be activities with a purpose that even the child can see. They must yield experiences that make the subject more meaningful than it would be without them. This is a criterion easy to meet because the new conceptions that are being met would remain empty and uninteresting without well-planned experiences to give them meaning. This holds throughout the period of contentful education. It holds for the study of research methods and educational statistics in the graduate school no less than for the study of geography and arithmetic in the fifth grade. All that is necessary is to fit the activities to the needs of the learner. Educational statistics become meaningful only when pursued through the attack on educational problems, just as geography becomes meaningful only when mastered through geographical experiences. The secret throughout is the method of direct attack. When a background of experience is already present, reflective reading may be a sufficient activity, but where such a background is absent or meager, activities of a more concrete nature must be provided.

The presence of subjects to be mastered presents the additional advantage of setting goals toward which systematic progress may be made. The child, like the adult, wants to know that he is going somewhere. It happens not infrequently that a child, who has become discontented in an extreme activ-

ity school, will have his contentment restored when transferred to a more conservative school. He now feels that he is making progress, that he is learning new things, whereas in the former environment he felt that he was marking time. (See Gates, '26, 679.)

4. *Activities in the various subjects.* The problem of finding activities for the different school subjects is simplified by considering the motor and the mental subjects separately. Manual training is an activity subject, and so are singing, instrumental music, dramatics, drawing, painting, and clay modeling. In these subjects there is only the problem of making a significant attack; activity of some sort cannot be avoided. Such theory and technique as are needed may readily be brought in when the need is felt.

In subjects like history, geography, natural science, literature, and arithmetic, reading must be recognized as an indispensable activity, but reading alone cannot give basic experiences. These must be provided for as needed, but when the method of direct attack is adopted, the activities that can supply them are spontaneously revealed. The teacher who imagines that activities are hard to find and that one must go far afield for them has not yet arrived at the heart of the problem. Listening to the teacher read a poem is a basic activity in literary appreciation, going out and getting acquainted with plants is a basic activity in nature study, and finding the number of miles to the nearest star, the rate of light per second and the light-years being given, may be a basic activity in arithmetic. (See Stott, '27.)

5. *Manual training.* A vital approach to manual training is presented by Miss Stott in *Adventuring with Twelve Year Olds* ('27, 8–23),[1] which is an account of the work in the City

[1] All quotations from this book are given with the permission of the publisher, Greenberg, 160 Fifth Avenue, New York.

and Country School of New York. Her pupils organized themselves into a toy company, christened by the children "The Never Bust Toy Company," for the purpose of making toys to sell at Christmas time in order to obtain funds for some of their school enterprises.

> Miss Pratt (the principal) then told of her own experience in making toys to sell and suggested the following general principles to work by: (1) toys should be related to each other in size and use so that they may form a part of a general play scheme; (2) they should be durable; (3) they should be decorative. She suggested using some general scheme to begin with, such as a farm or a city and working out models appropriate to that scheme. She also proposed making these models on a scale adapted to four-inch dolls since that has proved a good scale for our own use in the school. ('27, 8.)

The children entered upon the project with enthusiasm and carried it through to a successful conclusion. The prospect of selling the toys set a high standard of workmanship in every respect. The calculation of expenses and the reduction of everything to scale called for the use of arithmetic.

> As the day of the final Christmas sale approached, work became so pressing that Ben expressed the general sentiment by saying feelingly, "We've got to cut out studying this week" (the last three days before Christmas). I agreed and all turned their attention to toys, advertising posters, and the arrangement of the room for selling. Paul instructed all the sales people to accept no cash, but to make out sales slips for the customers and to send them to pay him at a separate cashier's table. There was no confusion at all in this, and his accounts balanced to the penny. Some interference by me was needed, however, to give the girls a chance at the selling.
>
> The sale brought in over $20 in cash, and the children decreed themselves a "day of rest" to celebrate this success. This was spent largely in the laboratory and shop, finishing individual Christmas presents or in the kitchen preparing for the school Christmas celebration. ('27, 19.)

It is quite obvious that the members of this toy company gained a great deal more than manual skill; they gained also valuable business experience. The freedom and initiation allowed the children throughout the project is noteworthy; yet it is worth noting, too, that the teacher and principal did not hesitate to give advice and to equalize opportunities when this seemed desirable.

Miss Stott's account of the work in music, clay modeling, shopwork, laboratory experiments, and dramatics is no less interesting and pedagogically suggestive than her account of the toy company. There are illuminating accounts, also, of the work in history and geography, English, foreign languages, and mathematics.

6. *Formal English.* The work in composition was closely correlated with other subjects, especially with history and geography, which gave rise to many spontaneous stories and essays. Work on spelling and grammar was continually called for by the pupils themselves as their own shortcomings became manifest.

7. *Literature.* The work in literature is well described by the following quotation:

> We asked Mrs. Mitchell to come in one day to read some poetry to the whole group. She began with Gibson's *Machine* and another poem by him about two miners. The next week she read Sandburg's *Fireman's Ball* and *Humoresque.* All were enthusiastic and invited Mrs. Mitchell to come regularly one afternoon a week to read to them. This she did for the rest of the month.
>
> A notice came to the school about a special dramatic performance of Dickens's *A Tale of Two Cities.* As a result the group became interested in reading aloud the story before seeing the play. When I asked how they liked Dickens's style of writing, Paul spoke up for all in saying, "It's good when you read it aloud but I could not get interested by myself." All

were intrigued by the growing elements of mystery, and hoped that Dickens would "remember to explain it all in the end." The reading was accompanied by much discussion of all the characters and some comparison of the French Revolution with recent happenings in Russia.

When we finished reading *A Tale of Two Cities*, all the group begged to continue the daily reading aloud. We decided to read one of Shakespeare's plays, letting each person read a part as was done the previous year. *Midsummer Night's Dream* was asked for and parts chosen.

There was a daily period for individual reading in the library for about forty minutes before lunch. Often some of the children went back in the afternoon for more reading. Sometimes they asked for help in selecting good books as, for instance, when Catherine was fascinated by Padraic Colum's stories of the Greeks and asked for more stories about them. I gave her Palmer's *Odyssey*. She liked it so well that she finished it in a week and asked for the *Iliad*. Usually they make their selections for themselves from the open shelves, or on each other's recommendations. Often as books were finished I asked for reviews of them to serve as a guide to others in the group. ('27, 85 f.)

8. *Geography, history, and civics.* The work in history and geography was conducted very much like that in literature. Geography served as a setting for the historical happenings. There was a textbook, but it served in a minor rôle. There was much reading aloud, much discussion, and sources and treatises were searched, especially in preparation for papers to be read to the class. Relief maps were made, but there were no activities that were extraneous to the work immediately in hand. Had a demand for a dramatic rehearsal arisen, it would probably have been adopted.

Dramatization and dramatic expression are deserving of important places in the teaching of history, civics, and geography up to the senior-high-school period, and in literature up to the

college period. For children they put meanings back of conceptions that go far beyond what the imagination alone can supply. Dramatization, by which is meant the writing and producing of a play, takes much time and so cannot be used frequently, but the stimulation and illumination that it produces at one point help to vivify others also. Dramatic expression, by which is meant an informal acting out by the pupils, takes less time and so may be used frequently. It is especially helpful in history and civics.

Helpful instances of dramatic expression are given by Scott ('08, 141) and by Knowlton ('10, 481). Knowlton allowed his ninth-grade classes in ancient history to form themselves into an Athenian Assembly in which all the features of the original assembly were closely copied. The original Greek names were used throughout. The meetings of the assembly took the place of the regular class exercises and the topics for discussion were introduced in the form of resolutions. The spirit with which the pupils entered into this work, and the hold that it gained upon them, is indicated by the following extract from one of the final test papers. The resolution for discussion was the question of undertaking an expedition to Sicily for the sake of conquest.

> Athenian citizens, do not allow yourselves to be dazzled by the prospect of gaining a new province, thus making way for a new empire in the west. Will you send all of our army, all of our navy for the sake of a new empire, when our city needs to be protected? Do you not think that the minute our army and navy depart the Spartans will seize the opportunity of marching against the almost defenseless city? You say we will still have men. Yes, but look at the great host the Spartans will be able to send against us. We have men, but our best men will be absent. What is an army without a leader? What good will a new empire do us, even if we should establish it, when our city is destroyed, as it most probably would be?

The opportunities for dramatic expression and field trips in civics are so obvious that no space need be taken here for their discussion, but the possibilities of field work in this subject are sometimes overlooked. A particularly vital piece of such work in community civics was carried out by a junior-high-school class in a West Virginia city a few years ago. The class divided itself up into committees, to each of which was assigned the investigation of some aspect of the community. One committee studied the waterfront and shipping, another business and manufacturing, another police protection, another parks and playgrounds, and so on. As the committees were ready to report, the class met for a discussion of what had been found out. The report on playground facilities proved to be especially thorough and incisive, so much so that the chairman of the committee was first requested to present her report before the Rotary Club and then before the City Council. The Council was impressed to the extent of appropriating an additional $10,000 for the extension of playground facilities. School work of this nature has the vitality of reality.

The use of dramatization in history was recently exemplified by a sixth-grade class in Washington, D.C. This class, of its own accord, decided to write and produce a play on "The Settlement of Massachusetts."

THE PLAY

Act I. Puritan home and troubles in England.
Act II. Scene in Holland.
Act III. Aboard the Mayflower.
Act IV. Landing on Plymouth Rock.
Act V. Puritan Cabin; hostile and friendly Indians.

The writing of the play induced a study of the period far beyond that produced by an ordinary assignment. Everything had to be clearly understood and every dramatic inci-

dent was seized upon. Incidental activities that resulted were:

Designing and painting the scenery (old sheets were used).
Designing and making the costumes.
Making a framework, covering and painting a rowboat from which the Pilgrims landed on Plymouth Rock.
Making Plymouth Rock.
Devising stage settings for interiors of cabins.
Making stage accessories, such as clay cups and dishes, pottery, a table cover, a rug, etc. Some pieces of furniture of proper style were borrowed from homes.
Writing invitations.
Printing programs.

The pupils with this same teacher, although not the same children, decided the following year to produce a play on "Prehistoric Times and People," a topic that had caught their imagination from hearing the teacher read to them "The Cat that Walks by Himself" from Kipling's *Just So Stories*. One morning at the end of the current events period, one little girl said, "This isn't a current event, but if the rest of you agree and the teacher is willing, we could make it an event in our room. Some of us think it would be fun to try to make a play out of 'The Cat that Walks by Himself.'"

All agreed, but Julian thought they ought to have a first act to let the audience know how people came to be living in a cave and why they wore such queer costumes. From that time on the tail began to wag the dog. They became so interested in the first act that it was expanded into three, and the idea of dramatizing the Kipling story was first deferred and then abandoned.

THE PLAY

Act I. The discovery of a cave for shelter.
Act II. The discovery of fire.
The discovery of cooked meat; development of cooking.

Act III. Making weapons, baskets, pottery, and ornaments of shells and strips of leather.
Discovery of flint for starting fires.
Making pictures on the walls of the cave.

Some of the books conned in preparing this play were:

The Story of Mankind, Hendrik Van Loon.
A Child's History of the World, V. M. Hillyer.
Our Nation's Heritage, Halleck and Frantz.
The Book of Knowledge.
The Early Cave-Men, Katharine E. Dopp.
The Later Cave-Men, Katharine E. Dopp.
The Tree-Dwellers, Katharine E. Dopp.
The Cave Twins, Lucy Fitch Perkins.

A reading of the play gives one the impression that these children gained an insight into primitive life that even the cultured adult might envy. They *lived* the problems of primitive man.

Suggestions for activities that may aid in the vitalization of American history are appended to the close of every problem in Casner and Gabriel's *Exploring American History* ('31). These include the writing of essays and stories, the drawing of maps, the making of relief maps and of models, dramatization, and especially the learning of songs that have come down to us from former times and that express the spirit of those times. These suggestions will be helpful *if* they are used with freedom and discrimination; they will be harmful if they are used primarily as a means of supplying busywork.

9. *Mathematics.* The twelve-year-olds in the City and Country School should have been ready for work in percentage in September, 1926, but a review test revealed that six pupils needed further work in fractions and decimals. These six realized their deficiencies and were eager to bring them up.

To put more reality into their problems [says Miss Stott ('27, 122)], I started them on calculations of the cost of the wood used in the various toys they were making. This involved quite difficult fractions and mixed numbers. They were also very much interested in actual problems of measurements, and learned how to measure lines with a compass.

In December Mr. Kusner came into the school for special work on mathematics and Marshall, Leo, and Paul (of the advanced group) at once seized the opportunity to go to him for "free work," asking to learn how to "measure by angles." Ben and Adam had their interest roused by the work the other boys were doing in intuitive geometry, and went to Mr. Kusner. A little later Catherine, Polly, and Ellen became interested and organized a third group.

This was principally a study of the properties of angles, triangles, and other geometric figures. So far as possible the children discovered by themselves most of the properties of triangles and polygons. The Pythagorean theorem, for instance, was first studied experimentally and then logically proved. In dealing with this theorem they found for themselves the need of knowing how to find the square root of a number and wanted to learn how this was done. They worked on this process at some length before they mastered it. They seemed fascinated by very large numbers.

In all groups, some consideration of elementary theoretical astronomy often grew out of discussions of the practical uses of the properties of triangles. The children always enjoyed this and asked endless questions. With some of the boys this led one day to an explanation of the trigonometric functions. Adam and Ben decided they would like to make, from measurements and calculations of their own, a table of tangents. The resulting table agreed quite closely with an accurate one with which they compared it when finished. ('27, 122–125.)

These quotations are sufficient to indicate the nature of the work in mathematics and the interest that this aroused. The attack on mathematical problems was direct, concrete, and functional, and the procedure was in the main psychological.

Logical systematization and the filling in of gaps, however, was not omitted, and at the end of the year the group took the *Stanford Achievement Test* with flying colors. One pupil had made a gain of over two full years since February and all of them were well above their chronological age. "I felt that in this respect the test did reflect a real development, though, of course, it did not include any measure of the wider interest in mathematical thinking which had become so live an interest, especially for the more advanced workers." (Stott, '27, 129.)

The final words in this quotation make one wonder if the standardized test did not fail to measure the most important aspect of these children's mathematical growth.

Miss Stott's account of the work in the City and Country School gives an impression of splendid vitality with good progress in systematic achievement, and it contains nothing that could not, in principle at least, be carried out in any public school. All that is needed is freedom from routine, books and supplies, a school building with properly equipped rooms, and teachers with vision in respect to children, subject-matter, and method. (Now that it is before me I see that this order is larger than some public schools could fill.)

10. *Science.* It was noted in Chapter I that laboratory work in science in the secondary cycle of education should resemble nothing more than well-directed play. What the pupils need at that stage is to acquire a rich background of experiences with scientific facts and phenomena. Those pertaining to physics and chemistry may be obtained largely in the laboratory, liberally supplemented by field trips, but those pertaining to botany, zoölogy, and geology need to be obtained in the main from field work and gardening outdoors. Formal laboratory work that systematically follows a manual has only a minor place below the collegiate cycle, a fact that has long been recognized (Michelson, '09, 3–4), and that has now been quite con-

clusively demonstrated (Kiebler and Woody, '23). In the secondary cycle, the natural history point of view instead of the mathematical point of view needs to predominate. Every pupil needs to get some first-hand laboratory experience, but unless this pertains to problems in which he has a direct interest the work is likely to be meaningless. Lecture demonstrations have a place fully equal in importance to individual experimentation, especially in physics. In chemistry more of the concrete work must rest on individual experimentation.

Much splendid work in science from the natural history standpoint is now being done in our junior high schools. This work needs to be expanded so as to cover all of the science work of the secondary cycle, relegating to the college the formal and abstract aspects of the work that are still playing havoc with the science work in our senior high schools. If the equivalent of three full years were devoted to the natural sciences in the secondary cycle, the essentials of physics, chemistry, plant life, animal life, geology, and astronomy could all be covered. The attention in this work would have to be centered on the environment and on experiences rather than on the sciences, as such, yet systematic work is not excluded by this conception. Systematic progress adds rather than detracts from interest, so that a well-planned curriculum, sanely used, would need in no way to interfere with vital instruction.

In physics the Montessori idea of self-educative apparatus should be effective in yielding the experiences that pupils need in order to understand the physical aspects of their environment. A machine or an appliance constitutes a challenge in the environment of any young person. He starts in by making it go and then he becomes curious to find out the whats, the whys, and the wherefores. It should not be difficult to set up appliances for mechanics, for sound, for heat, for light, for electricity, and for magnetism that would in quite a spontaneous

way yield the basic laboratory experiences that secondary pupils need. Challenging problems would arise from the class demonstrations and discussion and these would then be worked out in the laboratory. Important experiments should be written up in laboratory notebooks, but care must be taken to make this significant. Writing sets a demand for thinking a matter through, and when this is done with a purpose it is vitalizing. The purpose might be to contribute something to the other members of the class who had not performed this particular experiment, to contribute a page to the science album of the class, to write something for the school paper, or to make a personal science manual that the pupil himself might highly prize. That is, the preparation of laboratory notebooks must be lifted out of the plane of mere laboratory routine.

The laboratory work of the City and Country School, as described by Miss Stott ('27, 131 f.), consisted largely of experiments in physics and chemistry. The laboratory was in charge of Mr. Paley and the pupils went to him mainly for the purpose of making something or of trying some experiment in which they themselves had become interested.

> Marshall and Ben chose physics and wanted to make a hydraulic press. Mr. Paley gave them a book on physics and told them to look up the principle of the press for themselves. They did this with great interest and success. They worked in after-school periods as well as in the regular morning time. Both learned the necessity of precision in scientific work.
>
> Adam worked during all of October on an engine to go into a boat he had started at home. He is a slow worker, but is intensely interested in the principle of the various types of engines and explained them to me [Miss Stott] clearly from his own drawings.

These instances are quoted to bring out another phase of laboratory work that is highly effective with youngsters — the making of physical appliances. I suspect that the making

of radios has taught children more physics than many a high-school course in the subject.

A new type of laboratory work developed during February through Harry's inspiration. He had been working in the laboratory by himself mornings and had become interested in making acids. Paul joined him in this work during an after-school period and both boys asked Mr. Paley to tell them how one could know what is needed to make a specific acid. Mr. Paley pointed out to them that hydrochloric acid, for instance, is composed theoretically of hydrogen and chlorine; that ordinary salt is composed of sodium and chlorine, and that all that is needed is to have the chlorine of the salt combine with the hydrogen of another acid. This type of synthesizing caught their interest and Harry said he had made hydrochloric acid before but he never understood exactly what had happened. The boys then asked Mr. Paley to arrange a series of experiments that would give them facility in predicting such happenings. This was the beginning of a course in chemistry.

In another connection Mr. Paley interpreted the symbol SO_4 as meaning that there was one atom of sulphur to four atoms of oxygen. One of the boys objected, "But you can't really see an atom. How can we know that this is true?" Mr. Paley explained that in the equation referred to the formula represented the smallest amounts theoretically obtainable, but that they could be multiplied indefinitely and so be made to represent quantities large enough to be dealt with concretely. The boys set right to work to multiply both sides of an equation and satisfied themselves that it could be done without destroying the accuracy of the statement. One of the boys reported later that an algebraic equation was just the same as one in chemistry; that if you multiply one side you must multiply the other to balance. From this time on the chemistry and mathematics constantly reinforced each other.

Just before the close of school, Mr. Paley gave the group sixty review questions from Dinsmore's Secondary Chemistry, and was delighted with their ease in answering. These questions covered about one term's work in high school elementary chemistry.

The work began very informally and the procedure in the main was psychological, but before the work was left a systematic understanding of a large section of chemistry had been acquired. Laboratory notebooks were carefully kept and these added to, rather than detracted from, the interest. We have here some fertile suggestions for procedures in science teaching in the secondary cycle.

No one has yet, to my knowledge, worked out a plan for the natural history attack on the plant and animal life in the environment. Our high-school teachers in this field are proceeding as if one could acquire the science of biology without first acquiring a broad and sympathetic acquaintance with the plants and animals themselves. As a result, our students are coming through botany, for example, with little, if any, more acquaintance with the plants themselves than they had before they took the course.

It should not be difficult for a stimulating teacher with a few challenging problems and a supply of appropriate manuals to start adolescent pupils exploring in a vigorous manner the riches of nature about them. They need not all be doing the same things at all. One might start with trees, another with weeds, another with flowering plants, another with grasses, another with birds, and so on. Gaps could be filled and system introduced later on in the course. The careful study of some specimens in the laboratory should be provided for. With real problems before them and with access to textbooks and manuals, the pupils would acquire the theory they needed with little assistance. Class conferences would find a place as needed. The teacher should be a well of information and should be ready at all times to answer questions. The keeping of notebooks would be helpful and the making of herbaria should be encouraged. Self-initiated activity would be the keynote in procedure, and

after the work was once started, only stupid teaching could stop it.

School and home gardens may be used to splendid advantage in practical botany. Gardening is in itself a delightful occupation, into which the school may well initiate the rising generation, and it supplies the opportunity for concrete experiences with plants from seed time to harvest time. When space permits provision should be made for raising the cereal grains, such as wheat, oats, barley, and rye. City children now frequently know more of coffee, tea, bananas, and other far-away plants than they know of the grains and vegetables that grow in their vicinity and on which they mainly subsist. Experimentation with foreign plants need, of course, not be excluded.

11. *Summary.* Activities in education constitute the key to effective learning and to educative instruction. These activities include listening, reading, writing, and discussion no less than shopwork, field work, laboratory work, and dramatic expression. The only general criterion that can be laid down is that the activity should yield the knowledge or experience to be acquired. Creative activity is as germane in natural and social science as it is in literature, music, and the space arts. Activity programs constitute the backbone of the curriculum only in the primary grades, after which the curriculum begins gradually to branch out into subjects. In these subjects, however, activities still continue as the heart of the learning process. Many dynamic procedures have been worked out in the various subjects, but in all fields, particularly in the natural sciences, there is much room left for further experimentation. The curriculum must be broad enough to touch all the significant aspects of life and to develop all the capacities of the children. Freedom and initiative are given ample play, but this need in no way to interfere with hard work and systematic

achievement; in fact, the two play into each other's hands. Motive supplies the drive in the process and it is to this topic that we shall turn next.

EXERCISES

1. Point out why writing is often an effective learning activity.
2. What is meant by the scientific attitude and how may this be cultivated?
3. Show that the direct attack in foreign language teaching is an activity attack.
4. What is meant (or was meant) by projects, project curriculum, and socialized recitation?
5. What is the Montessori method and how does it differ from the Froebelian method of the kindergarten?
6. Outline a curriculum from the natural history standpoint for plant life and for animal life, covering the work from the fourth to the tenth grades.
7. Point out how the activity principle in education might be more fully realized in college teaching. Apply it to government, zoölogy, physics, and mathematics.
8. Point out that school credit for home work may serve effectively to integrate the school with the home and other aspects of life. (See Alderman, '15, and Ruediger, '23, 75.)
9. Is the number of pupils that can be handled per teacher by the direct attack with activities necessarily less than in the traditional school? Explain, going into different subjects. Why is this question important?
10. A great point is made by advocates of activity schools of educating the whole child. What do they mean? What, if any, aspects of education are there that may safely be left to out-of-school agencies?
11. A schoolman recently said: "If we could only get teachers to stay in the back of the room instead of the front, for half the time at least, what a difference it would make in the vitality of the work!" What had he in mind?

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CHAPTER XIX

MOTIVATION

1. *The problem.* In talking with a veteran superintendent of schools about the principles and techniques of teaching a few years ago, he looked at me as if he thought that I had altogether too complicated a notion of the teaching process, and said: "My observation has convinced me that the basic thing in teaching is to get the interest of the children; if you get that, you can't stop them from learning, and if you don't get that, they won't learn no matter what you do."

Whatever else this statement may mean, it is clear that this superintendent looked upon interest as the key to effective learning. With that position we can all agree. Both casual observation and experimentation leave no doubt of the fact that interest is indispensable in the learning process. When this is granted, it follows that we have here a force that the teacher must understand and intelligently control.

The problem for the teacher is not so much one of arousing interest as it is to keep from killing the interest that the pupils spontaneously have. The teacher needs to learn how to connect up with the interests that children come to school with and how to maintain, direct, and develop these interests. To read, to write, to figure, to know about other people and places, to understand the secrets of nature, to sing, and to read poetry are as interesting to children as to play tag, baseball, and hide-and-go-seek. Note the enthusiasm with which children usually enter school, the enthusiasm with which they begin new subjects of study, and then notice, too, that some teachers are able to maintain this interest throughout the school year. These may be our born teachers, and it may be that we cannot

copy their personalities, but we can extract and use the principles underlying their methods. These teachers, without exception so far as my observation goes, use direct, concrete, and vital modes of attack, while the teachers who fail to maintain interest use indirect, verbalistic, and formal modes of attack. When children are losing interest in geography, in singing, or in poetry, the chances are good that our teaching procedures are killing this interest.

2. *Meaning of motive.* Children, like adults, are by nature in the pursuit of experiences that will make their lives significant and meaningful; they are after values, no matter how implicit this pursuit may be. To make a wagon, to build a shanty in the woods, or to become expert at tennis or baseball is for the child to attain a value of great price. Values are the goals of achievement; they are the possibilities of rounding out the present deficiencies of the personality. Any value that is alluring enough will move one to action in order to attain it. A value that has the power to move one to action is called a *motive.* Interest is the drive in the motive, but unless this interest is strong enough to move one to do something, it does not reach the level of motive.

We speak of a person being motivated by jealousy, by revenge, by ambition, or by curiosity, but when we do this we assume the presence of an objective thing or situation to which the emotion is attached. The person is curious to understand the operation of the auto-gyro, ambitious to attain the class presidency, revengeful against Mr. Doe for having humiliated him in public, or jealous of his rival in business. Every complete motive is composed of both an objective situation and a moving emotion.

3. *Classes of motives.* The motives that keep one going in life are extremely varied, but they may all be divided into two classes: (1) specific and (2) general, or (1) intrinsic and (2) ex-

trinsic. A specific motive is one that is aroused by a single value or objective which alone can satisfy the motive, or which, if removed, would also remove the motive. A student who has become interested in the stars has a motive for studying astronomy, and this motive can be satisfied by nothing else. Grammar cannot be substituted.

A general motive is one that is applicable equally to a number of subjects, things, or situations, such as working to gain the approval of the teacher, to achieve Phi Beta Kappa, or to avoid being kept after school. Here the real motive is extrinsic to, or outside of, the subject studied so that what is studied is immaterial so far as the motive is concerned. A high grade in one school subject is as valuable as one in another for obtaining the end sought. The subject studied is merely a means to an end lying outside of itself.

In respect to being means and not ends, general motives are all alike, but this is not the case with specific motives. The satisfaction gained from studying astronomy may be the primary purpose for studying the subject, but such satisfaction is not likely to be the primary purpose for studying the principles of teaching or the art of typewriting. We have here two types of specific motives in which the end-means relationship is different. These may be designated respectively, (*a*) theoretical motives and (*b*) practical motives.

The theoretical motives are the liberal-culture motives. In a liberal education the immediate goal is to understand the world in which we live and to acquire a wholesome attitude toward it. This should ultimately lead to an intelligent and dependable participation in the general affairs of men, but the precise nature of this participation is seldom foreseen while studies in school are being pursued.

The practical motives are, in general, the vocational motives. A student takes the principles of teaching for the prim-

ary purpose of preparing for the profession of teaching or for improving his classroom efficiency, and another takes up typewriting for the purpose of securing a position as secretary. The subject is a means, not an end. It is a means, however, that is so closely bound up with the end that the motive for studying the subject remains specific. Preparing for teaching implies the study of the theory of teaching, for which grammar, or any other subject, could not be substituted. Being a secretary involves typewriting, so that the subject really becomes an aspect of the calling. The means and the end are phases of the same pattern and so can in reality not be separated as is the case in the general motives. The interest in one belongs to the other also.

The theoretical and practical motives often have separate significance in education, but the two are not inherently incompatible. The practical purpose for studying the theory of teaching need in no way interfere with a high theoretical interest in the theory itself. The practical and theoretical motives may, and should, coöperate. There is no reason why medical students should not be quite as much interested in the theory of medicine as in the use to which they expect to put that theory.

4. *Relation of specific and general motives.* The relation of specific and general motives is, if not similar, at least analogous to the relation of practical and theoretical motives. In distinguishing them as sharply as we did, we did not mean to imply that they are incompatible or that one is good and the other bad, for that is not the case. They merely have different rôles to play and within these rôles there is no question of better or worse. A motive becomes bad or improper only when it goes beyond the bounds of its proper sphere.

In general we may say that it is the function of the specific motives to initiate and guide lines of activity and of general

motives to support and sustain these activities. The two are supplementary. Children beginning the study of a foreign language, for example, are as a rule, highly enthusiastic at the start. The specific goal, that of reading, speaking, and writing the language, is most enticing. They imagine themselves using the language in a month or six weeks. This launches them with a high degree of interest; but by the end of a month or six weeks they are beginning to realize the magnitude of the task that they have undertaken. The goal to be attained has moved far into the future and has lost much of its motivating force. It is now the time for the general motives to come in. No child relishes being a quitter, neither does he want his teacher and his parents to lose faith in him. These, and similar, motives may now, without any outside aid, begin to function, but should they not arise spontaneously, the teacher or the parent may stimulate them. These motives will support the specific motives and will help to maintain the arduous duty of study, without in any way interfering with the motive that arises from the intrinsic value to be derived from the subject itself.

5. *General motives and social attitudes.* The general motives arise primarily out of our social interrelationships. We are so tied up with others that what we do becomes of concern to them as well as to ourselves. This makes them interested in what we do and how we do it, and this interest in turn influences our responses, or produces motives in us. We wish to stand well in their estimation and to merit their esteem. This may be, and in the main is, entirely wholesome. The person who pays no attention to the feelings of others is anything but an agreeable companion. He is the source of endless friction in social intercourse. In their upper ranges, and if courtesy is regarded as a duty as well as an adornment, then through their entire ranges, the general motives coalesce with our moral and social atti-

tudes. The sense of duty, the desire to smooth the path for others, and the dependability of the person of honor and trust are all general in their nature. This identifies the development of the general motives with our best conceptions of moral training.

The person who lives according to principle, who is guided by a sense of duty, no doubt feels that he is guided by this inner sense directly. He is not aware of any ulterior ends toward the attainment of which this inner sense serves as a means. He feels that he is not cold and calculating, that he is not watching for some objective advantage, but that he is guided by sacred, eternal, and undeviating principles of right and wrong; and as he speaks, the warmth of his conviction is reflected. He is right; this is precisely the way he should feel. Moral attitudes in the routine affairs of life do and should function directly and automatically, for they are not fully developed unless they do; but this is not incompatible with the idea that they must ultimately be justified by their objective effects. The ultimate purpose of moral principles and attitudes is to make possible the diverse and meaningful aspects of our civilized social life, but fortunately the uniformities of life do not require that we think out the effects of our conduct every time we act. Basic guiding attitudes may become ingrained and function directly. These attitudes are not artificially grounded; they rest upon the inherent and eternal principles of social living, a fact that connects them with the tenets of the leading religions.

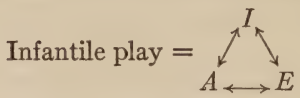
6. *The abuse of general motives.* The general motives are used improperly when they are allowed to supersede the specific motives in the process of initial motivation. We have instances of this in school when students are working primarily for marks, for credits, and for honors, and when teachers use the threat of low marks or failure as a whip. In the social

field we have kow-towing and boot-licking, and other forms of hypocrisy as instances.

The reason why working primarily for marks is unfortunate is because it centers the attention of the student on the wrong thing and so produces a divided personality. True learning implies the processes of assimilating, understanding, appreciating, and applying knowledge, values, techniques, and skills, and if the attention is primarily on something else these processes can proceed at best only mechanically. The learner views the products of learning only as means to marks, credits, and honors, which he does value, and he cannot at the same time also value and master the full significance of the learning products. Attending primarily to the learning products, taking in their significance and gaining control over them, should lead to the appropriate marks, credits, and honors as concomitants, for that is the way the pattern runs, but the pattern cannot be reversed without distorting it. Where your treasure is, there will your heart be also.

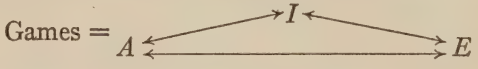
7. *Relation of end and activity in specific motives.* In the specific motives the end to be attained presents itself in a variety of relations and degrees of remoteness to the activity needed to achieve this end. In *infantile play* the two are found essentially together. When a baby beats a saucer with a spoon and rejoices in the noise he makes, the end, which is the noise, is achieved at every stroke, the needed activity. End and means are equally interesting. When an older person twirls his thumbs or hums a tune or throws at a mark, we have the same type of situation. The play of animals is also essentially of this nature.

If we let I stand for interest, A for the activity, and E for the end or product, the relationship may be diagrammed as follows:



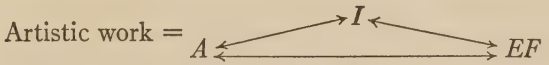
The activity and the end are placed close together, interest attaches equally to both and so is placed midway between them, and the flow of interest, indicated by the arrowheads, moves freely in either direction.

In amusements that we call *games* the end is no longer achieved with each stroke or action. When a little girl has a tea party for her doll, when a boy builds a fort with his blocks, or when adults indulge in a set of tennis, a series of actions is necessary before the end is achieved. Interest, however, again inheres equally in the activity and in the end. We enjoy the activity, but we enjoy the outcome of the activity no less. The relationship here has to be diagrammed as it was in infantile play, except that *A* and *E* must be placed farther apart.



There is a type of work in which the activity, end, and interest are related psychologically as they are in games. We imagine that the artist painting a picture, writing a poem, or composing a melody faces a situation that is just as alluring as that of a person engaged in a game. This type of work may, therefore, be called *artistic work*, but it is not confined to the artist in the narrow sense. Every person who does his work in a spirit of delight, who is interested in the process as well as the product, and who takes an esthetic attitude throughout, has a right to the designation of artist. It may include the laborer in the field, the hand in the factory, the salesman in the shop, the surgeon in the hospital, or the teacher in the classroom. There is no type of effort that may not attain to this stage.

Although artistic work and games resemble one another in spirit, the former includes an element that is not present in the latter. This is the economic outcome. Work of all kinds aims to render a service, or to produce something useful or ornamental. This element we may designate by the letter *F*. The type of activity may then be diagrammed thus:

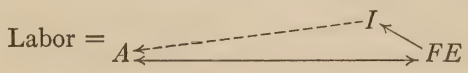


The *F*, or financial aspect, should be placed after the *E*, for in artistic work it is subordinate in the motivating process.

Work without any qualifying adjective differs from artistic work mainly in the position of interest, which moves closer to *E* and farther from *A*. The interest shifts primarily to the end. No inherent interest is taken in the activity, yet the activity is not done without interest, for the interest in the end flows into it. Much of the work of the farmer and shopkeeper may be of this type, but it may be present in any realm. It may be diagrammed as follows:

F still remains secondary to *E*, but there is no longer any flow of interest from *A* to *I*.

Next below the order of work in economic activity we have *labor*. The laborer, as the saying goes, is worthy of his hire, and that, as a matter of fact, is often all he gets. The product that he produces is not his; he may not sell it and he may not take it home. The motivating power of *E*, therefore, is greatly enfeebled, for the laborer's heart is centered on *F*. In diagrammatic form these relations may be expressed as follows:



F now precedes *E*, and the feeble radiation of interest to the activity is represented by a broken line.

This situation has tremendous significance in the world of employment, whether this be in industry, in commerce or in clerical work. It explains to a great extent the disappearance of the spirit of craftsmanship from modern life. The laborer all too frequently receives no credit, or very inadequate credit, for what he does. His work is merged in that of the crew or is put out over the name of the chief or foreman. This comprises a handicap that only the superior person is likely to overcome. The remedy must be sought in giving the worker a share in the product of his efforts. He may be made a stockholder in the firm or share in the profits or losses. In clerical productions, such as government reports, his name may appear among the collaborators. All this is being done, to some extent, but it needs to be vastly extended to bring in more generally the spirit of ownership and to raise the attitude of the laborer to one of the two higher levels.

Below labor, but not necessarily in the same economic series, is *drudgery*. This may be found anywhere; in the schoolroom, in the household, in the professions, no less than in labor, in commerce, and in industry. I once heard a student say: "I'd like to know a lot all right, but I do hate to dig for it." The housewife may fully appreciate the sanitary and esthetic value of clean dishes neatly arranged, yet may find the routine of washing them, drying them, and setting them away three times a day entirely irksome. Teachers may find the correction of daily themes, notebooks, and test and examination papers monotonous and tiresome, even when their activity in the classroom is on the artistic plane.

The remedy here cannot be found in any economic readjustment, as a rule. The worker must find it himself in the possibilities of the work. There may be meanings and esthetic

possibilities that he has not seen; let him reflect. There may be techniques that he has not discovered; let him experiment. Company may prove a help, but also a hindrance.

The relationships in drudgery may be diagrammed as follows:

E again takes precedence over *F* and the radiation from *I* to *A* disappears altogether. The end alone must stimulate the activity, which remains uninteresting.

It may seem that we have gone as low as we can, but we have not. There still remains the condition of *slavery*. A person may take no interest in either the end or the activity and still he may be compelled to go through with it. A boy in school may not care one snap about gaining an insight into *omega*, and as for getting pleasure out of studying the subject, that may to him be quite inconceivable. He finds himself in a situation similar to that of the slave, who gets no richer from his toil, who gets no thrill from his product, and who gets no satisfaction from his activity. The diagram becomes very simple.

I disappears altogether, and there are no arrows between *A* and *E*. An arrow appears to the left of *A*, which may be likened to a kick from behind. Motivation must issue entirely from extrinsic sources, to a further consideration of which we shall turn presently.

This analysis has far more than an academic significance. It analyzes for the teacher the situations that he and his pupils face every day in the schoolroom. The analysis may even, to good effect, be placed before the pupils so that they may

see where they stand in relation to their own work. The ideal sphere is found in artistic work, and that is no closed circle. There are no secret ballots and no blackballing. Anyone may attain to it. No pupil is getting out of life what he should if he is not getting joy out of his work. If he is not getting this joy, he should learn always first to look to himself for the reason. The problem may be partly that of the teacher. Pupils are in school five hours a day, five days a week for nine or ten months of the year, a total of at least one hundred and eighty days. The responsibility of making these days meaningful, significant, and happy falls largely on the teacher. If the work of the school as a whole is not proceeding in the spirit of conquest and joy, the causes and remedies must be sought by the teacher.

Plays and games have an achieved place in the kindergarten and primary grades. The attitude of labor has no legitimate place in the school, although it may enter when parents pay pupils for the marks they make and when teachers set up prizes and other artificial incentives. Work is a wholesome state and we may frequently be in it without any cause for blame. When one has a cold, when one is not properly rested, or for many other reasons, one may not be able to rise to the spirit of the artist, but the work must go on. Drudgery may be an element of every line of activity that it is possible to pursue, but the amount that is actually met is primarily an individual affair. What is drudgery to one may be full of meaning and interest to another. There is such a thing as having sense enough to like one's work. All necessary aspects of work have meaning and many of them have esthetic qualities.

8. *General motives as points of departure.* The concept of slavery brings us back to a further consideration of the place of the general motives in education. Has even the attitude of slavery a place in school? May a pupil, or even an older

student, be started on a study primarily, if not solely, through compulsion? Certainly, if we are moderately certain that the study is placed right in the curriculum and that the pupil is normal. If the pupil is not normal, we ought to discover that and then give him the kind of educational treatment that he needs. If he is normal, he ought to have potential needs that will soon become active. A dislike for a subject before it has been attempted is poorly founded. It can rest only on a prejudice of some kind. Once the pupil gets into the subject, he should see meaning in it, become interested, and rise to a higher plane of motivation. If he does not become interested, there is something wrong somewhere and the cause must be looked for. To keep a pupil in the attitude of slavery for a long time is likely to do him more harm than good. Knowledge acquired under the spirit of antagonism is of little avail and the attitude of slavery tends to set on edge and disintegrate the personality of the pupil.

In high school and college, difficulties in this connection are sometimes caused by required subjects. This is primarily a problem of curriculum construction, complicated in high school by college entrance requirements. When a curriculum has been constructed with care, when the teachers, as adults, feel that they have put into it as requirements only what the student actually needs, then we may safely say that no student should be permitted to substitute an elective subject for a required subject until he has demonstrated in class that he lacks the qualities to master the required subject. Lacking that test, even college students may be mistaken in what they think they want and don't want.

In 1921 a young woman of some experience came to us from one of the eastern states to enroll in our School of Education. She was a graduate of a normal school and had had sufficient work in a university to give her senior standing with us. She

came with definite convictions and knew just what she wanted, but unfortunately those wants did not coincide with the unsatisfied requirements of our curriculum. She wanted art and sociology, and our requirements, among other things, called for education, logic, and philosophy, which crowded out most of the art and sociology that she wanted. She asked for substitutions to be made, but I assured her that this could not be done, that the requirements were set by the faculty, and that the dean had no authority to change them.

Pedagogy! You should have heard her say *pedagogy!* Why, she had already had pedagogy *ad nauseam!* But "pedagogy" it was and she ended by taking the required courses, not, however, without telling me in no uncertain terms what she thought of an institution that made students take what they did not want and kept them from taking what they did want. I did not tell her so, but I admit that my confidence in my position was considerably shaken.

The matter having been settled, she did not bring it up again, and after her agitation quieted down she appeared to be taking an interest in her work. She was a competent student and came through the year with a splendid record. Just before Commencement in June, after all the grades were in, she came to my office to thank me for all I had done (*sic!*) for her, and especially to tell me what that year in college had meant to her. She had had the unique experience of going through the period of mental reconstruction. All the world looked different to her now and she was most delighted; and after telling me all this, she blushed and said: "And it is the studies that you made me take that did it."

9. *Motivation in the primary grades.* It may be maintained that the general motives are the main stimulants to activity in the primary grades and that the specific motives become more and more prominent as we proceed upward. So far as

explicit functioning is concerned, this is probably true. For primary children the world is still mainly one of personal relationships. They have implicit faith in their elders, whom they like to please and for whom they like to work. Social suggestion is especially potent with them and they like to do what others are doing. This does not mean that they need not know the purpose of what they are learning. They do know that reading, writing, and arithmetic are useful, and they take it for granted that adults know what they are about and that the curriculum they have prepared for them is worth while and correct. There is plenty of time for them to bother their heads about educational values and teaching objectives later.

10. *Misconceptions in motivation.* There are a number of erroneous, or at best doubtful, conceptions in the field of motivation of which the teacher should be aware. One of these is found in the idea that the spontaneous interests of children should determine what they should study. Spencer expressed the idea as follows:

> As a final test by which to judge any plan of culture should come the question — Does it create a pleasurable excitement in the pupil? Even when, as considered theoretically, the proposed course seems the best, yet if it produces no interest, or less interest than another course, we should relinquish it; for a child's intellectual instincts are more trustworthy than our reasonings. ('60, 127.)

A similar position is taken by some of the activity-school enthusiasts. Says Rugg and Shumaker ('28, 117):

> Many of the protagonists of the more spontaneous kind of education have conspicuously phrased the doctrine that the curriculum should not be planned in advance, that it could only be made on the spot. Basing education entirely on the dynamic urges of childhood, they have insisted that the curriculum shall grow out of the spontaneous interests of children.

The curriculum of activity schools is discussed briefly in Chapter XVIII. To say that the interests of children should be used is quite different from saying that they should be followed. The interests of children can often be used as points of departure in teaching and can be drawn upon to enliven and interpret problems already before the class, but there is nothing in child psychology to indicate that the curriculum in general should be determined by the impulses of children. The curriculum is an epitome of the arts, processes, knowledges, and ideals required in our civilization, of which the children know, as yet, very little. To set the curriculum is problem enough for the collective wisdom of adults. But once we have determined what the child needs to master, then the nature and educational status of the child comes in to determine curriculum placement, adaptation of subject-matter, and methods of instruction. The adult must decide whether or not history shall have a place in the elementary school, and if this question is decided in the affirmative, then child nature and development must be taken into consideration in determining what shall be taught, where, and how.

Another misconception in motivation has resulted from the misinterpretation of the so-called *doctrine of interest.* This doctrine is sometimes interpreted to mean that children should be interested at all hazards, which makes it synonymous with the idea of sugar-coating. The original meaning of the doctrine of interest was something quite different. It arose in the nineties in opposition to the doctrine of formal discipline and really should have been named the doctrine of significant or worthwhile subject-matter. Subject-matter should be worthy of interest, but whether it is actually eliciting the interest of children depends also upon some other factors. The subject may be misplaced in the curriculum or the teacher may be killing the interest by formal methods. Extraneous devices

for interesting children are not included in the meaning of the doctrine of interest.

When extraneous devices are resorted to extensively for the purposes of interesting children we have the idea of sugar-coating. It has the same meaning here as it has in medicine. Just as a bitter pill may be covered over with sugar and then swallowed pleasantly, so a disagreeable unit of education may be overlaid with entertainment and then taken in eagerly. The teacher who brought a syringe to school to illustrate a geyser no doubt entertained the children, for the next day they wanted more of that squirt, but he taught them nothing about the operation of a geyser, for the principles underlying the geyser and the syringe have nothing in common. Instead of using a device, some teachers accomplish the same purpose by themselves becoming pedagogical jumping-jacks.

The idea of sugar-coating is probably held by no one as an educational doctrine, but it is a pitfall into which some teachers do fall. For the teacher occasionally to use an extraneous device or an unusual gesture for the purpose of gaining initial attention is not objectionable, provided he succeeds in quickly shifting the attention of the children to the heart of the problem in hand and proceeds with that.

Learning is interesting when the learner feels that he is getting something worth while. Interest is a feeling state that accompanies significant learning, just as it accompanies all other significant acts. This indicates that the way to arouse genuine interest is to lead the pupils to see the significance of what they are undertaking. Once they see that, their active attention has been secured and they are ready to go to work.

11. *Effort and the "doctrine of effort."* Between interest and effort as used in everyday conversation there is no conflict. Effort in this sense is a link in the same chain with interest. The greater the interest in a goal, the greater is likely to be

the effort put forth to attain that goal. We resent being thwarted, and will go through fire and water to get what we deeply want. The interested and unspoiled student is never lacking in effort. Effort, even severe effort, is pleasant; we rejoice in it — granted always that it is motivated effort, that we see something significant coming out of it.

There is, however, another conception of effort that is radically different from the preceding, and that is the idea that the putting forth of effort is in itself a good thing, regardless of the objective end to be achieved. Its slogan is: "Effort for effort's sake." William James ('92, 149) expressed the conception as follows:

> *Keep the faculty of effort alive in you by a little gratuitous exercise every day.* That is, be systematically ascetic or heroic in little unnecessary points, do every day or two something for no other reason than that you would rather not do it, so that when the hour of dire need draws nigh, it may find you not unnerved and untrained to stand the test. Asceticism of this sort is like the insurance which a man pays on his house and goods. The tax does him no good at the time, and possibly may never bring him a return, but if the fire *does* come, his having paid it will be his salvation from ruin. So with the man who has daily inured himself to habits of concentrated attention, energetic volition, and self-denial in unnecessary things. He will stand like a tower when everything rocks around him, and when his softer fellow-mortals are winnowed like chaff in the blast.

Note the crucial points in this passage. Do "a little *gratuitous* exercise every day." Be "heroic in little *un*necessary points." Do something "for no other reason than that you would *rather not* do it." Inure yourself to energetic volition "in *un*necessary things." Why should the exercise be gratuitous? Why should the things we do be unnecessary? Why should we do things *merely* because we would rather not do them? Can we not get enough discipline by doing up to the

handle all the things, great and small, that are necessary; that ought to be done?

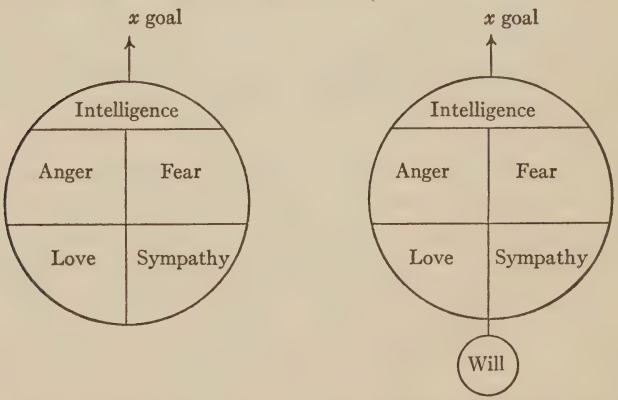
Granted that James meant what he said, and he did, what can one find to do every day that is gratuitous and unnecessary and that one would merely rather not do? If James practiced the doctrine, what did he do? One could dig a hole in his back yard one day and fill it up again the next day, but he had better not let his neighbors see him doing that often!

It is true that from the standpoint of common sense this doctrine seems insane, but we know that William James was not insane. He had a theory back of this doctrine that is worth understanding. James was a dualist and indeterminist in his metaphysics, and when one holds consistently to that position, the doctrine of effort, *which means unmotivated effort*, follows as a necessary consequence. Persons who hold consistently to the idea of effort in the ordinary psychological sense are, implicitly at least, monists and determinists. To understand James's position, then, we must inquire briefly into the difference between the dualistic and monistic conceptions of man and nature.

The essential point of difference between these two positions is very simple; so simple, in fact, that the beginner has difficulty because of the sheer simplicity of it; he is looking for something hard. The dualists, who are also by implication the indeterminists, assume that reality in ultimate essence is composed of two elements, (1) mind, soul, or will, and (2) matter, or material. The monists (determinists), on the other hand, assume that ultimate reality is composed of only one essence, reality itself, and that this manifests itself to us in objective experience as matter, and in subjective experience as mind or consciousness. This distinction appears simple and innocent enough, but from it follow tremendous differences in the conceptions of nature, of man, and of God.

The self, according to the monistic assumption, is the unified and correlated functioning of all one's mental powers. The will is not regarded as something outside of these powers that directs and controls them, but as the conative aspects of these powers themselves. Volition is nothing more than the mind, guided by past experiences, issuing into action. Control is obtained, not from the outside, but from the inside through educational development. In human conduct, according to the monistic conception, we have genuine and unified self-determination.

The self, according to dualism, is a dual affair. We have, in addition to the powers recognized by the monist, also a will, or spiritual ego, whose function it is "to boss the other powers around." The difference between the two may be shown symbolically by the following circles:



I. THE MONISTIC SELF II. THE DUALISTIC SELF

Figure I stands for the monistic self and Figure II for the dualistic self. Association fibers should interconnect the various powers in both figures, but are omitted for the sake of simplicity. A goal, x, to be striven for may be perceived

intellectually in either conception, and if obstacles appear in the way of achieving the goal, effort of the ordinary kind may be put forth in either. So far the two may function in the same manner; but suppose a conflict appears between the desires of the carnal self (upper circle) and the Will of the dualistic self. Then a tug-of-war results. A new type of effort that may be called moral effort or metaphysical effort will appear. The *Will* will have to exert itself to make the carnal self conform to its conception of right. This effort in the psychological sense is unmotivated. Motivation as commonly understood applies only to the carnal self. If one allowed it to apply also to the Will, the dualism would disappear and the two conceptions would merge.

The Will is supposed to be superior to our motives (which the dualist usually identifies with our desires for self-indulgence) and its function is to redirect them, if it is strong enough. To make it strong enough is the purpose of exercising it in tasks that involve pure effort. These tasks *must* be gratuitous, *un*necessary, and, from a mundane point of view, meaningless; otherwise the factor of motive would appear and the Will would be robbed of its opportunity to act. It is analogous to the school master whose function it is to get unruly brats to do right, but if they are already doing right, then he has nothing to do and so can get no exercise in developing his own stamina. This does give meaning and purpose to unmotivated effort. Its purpose is to develop metaphysical will power, but this meaning holds only in the dualistic conception. The moment you abandon that, you abandon also the conception of unmotivated effort.

To criticize the doctrine of effort from the monistic standpoint, as has often been done, is meaningless. If one does not like this doctrine, he can overthrow it only by overthrowing dualism, and in doing that he has a free field. So far no one

has been able to disprove the dualistic conception of reality, just as no one has been able to prove it; but the same holds also for the monistic conception. The two appear to be incompatible, and if one wants to be consistent in his thinking from the bottom up, he must adopt one or the other; the two cannot be mixed. Thinking in the natural sciences is in the main monistic, yet there are a few scientists who appear to be able to satisfy themselves on the dualistic basis. I confess my partiality to the monistic conception, but this should in no way influence the student. He must think this matter through for himself and come to his own conclusion. All that I would ask of him is to understand both conceptions and the consequences that follow from them. In present-day school practice the doctrine of effort has all but disappeared.

EXERCISES

1. What is the meaning of "soft pedagogy"?
2. How may interest and attention be distinguished?
3. Is this valid? "Feeling is the awareness of an impulse to action."
4. Give instances of potential needs becoming active, even without the prodding of the teacher.
5. Are the revelations of research in physics and biology favoring monism or dualism? Why?
6. Point out that general motives may function along with the specific in work, labor, and drudgery.
7. What is meant by the freedom of the will? What is the position of modern psychologists in this question?
8. What is interest, psychologically? Point out its objective and subjective aspects. Compare with motive.
9. If motives receive their significance from the values of life, where do these values get their significance?
10. What is meant by artificial incentives? Where should they be classified? Is their effect on learning wholesome or unwholesome? Why?

11. Make a list of the motives that actuate your parents in their various activities. What are the objectives that you are after in your various activities?

12. "The great problem of education is how to induce the pupil to go through with a course of exertion, in its result good and even agreeable, but immediately and in itself irksome." *Alexander Hamilton.* Is this valid today?

13. Classify the following under the heads of specific and general motives: Desire for approbation; to excel; to dramatize; to go with the crowd; for adventure; the urge to physical and mental activity; curiosity and investigation; construction; play; leadership and followership (Mueller, '28, 33).

14. William T. Harris, in discussing Dewey's interpretation of interest and effort, spoke in part as follows: "Dewey has forced the situation by his interpretation of interest. Will is the center and core of the highest pure being. God made a universe of freedom and evolution. This is the interpretation of the artist's work in the God who looks down from the Sistine Chapel. Will wills will. Dr. Dewey emphasizes self expression and has modified this to point toward interest. But interest points toward pleasure, etc." Point out the trail of indeterminism in these words.

SELECTED READINGS

On motivation and interest:

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On determinism and indeterminism:

Hankin, F. H. "Individual Freedom," in *Journal of Philosophy*, XXII: 617–634.
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CHAPTER XX

ASSIGNMENT AND PLANNING

1. *Meaning of assignment.* The teacher who says to her primary group, "Come, let us build a city in the back yard," has made an assignment, as has also the teacher who says, "For tomorrow memorize the states, with their capitals, that border on the Mississippi River." Even the teacher who gives the pupils a free period to do in as they like has made an assignment. The assignment may take pupils to the library, to the shops, to the gymnasium, or to the great outdoors; setting pupils to work in any way whatsoever is to give them an assignment. The only general criterion that can be laid down is that the work assigned should be intended to be educative.

Some teachers have gained the impression that in activity schools the pupils must choose their own pursuits and that it would be wrong for the teacher to make an assignment; that this would be an interference with the pupils' initiative. So extreme a position is taken by none of the leading writers on these schools. There are well-defined limits to freedom even in these schools, and no teacher is expected to give up his position as leader, counselor, and friend. The assignments in these schools are much better described as being coöperative than as being self-initiated by the pupils. Activities pertaining to the work in hand are frequently chosen and worked out by the pupils themselves, but that is not transgressing the bounds of legitimate freedom. Recall, for example, the dramatization of "The Settlement of Massachusetts" (page 303). This was initiated by the pupils themselves, but it was so closely related to the field of study that it constituted an excellent supplementary assignment. Had the pupils not

thought of it themselves, the teacher might have suggested it with equally good results. Pupils that have been for some years under the domination of a formal teacher will usually have to be started off on self-directed activities by the new teacher. Once they have tasted the delights of more freedom in work, they will themselves be on the alert to do significant things, but the laying out of the main channels of work is always the teacher's province. If the pupils should start out on something that would consume much time and yield meager or undesirable returns, such as building an elaborate model of the Panama Canal or paving the school yard, no competent teacher would hesitate to redirect their energies. So far activity schools have been experimenting with freedom, and some have occasionally gone pretty far, but they are now finding themselves.

2. *Quality of assignments.* A check on eighty-eight assignments made in the junior and senior high schools of Ithaca, New York, revealed the following:

Page assignment, no explanation	9
Page assignment, little explanation	3
Page assignment, with other references	4
Full, motivated assignment, given orally	62
Written on the board	7
Mimeographed	3
Total	88

Four of the seven assignments written on the board were made hastily with insufficient time for the pupils to copy them. This leaves sixty-nine, or approximately eighty per cent, of the assignments as having been made in a satisfactory manner — a very good showing. Many of the oral assignments could no doubt have been strengthened by definitely placing the main points in written form. Some of the briefer assignments may not have been fairly judged, for they may have been sup-

plementary, the main assignment on the unit having been made earlier.

This check on assignments was made by university students taking a course in observation. Their presence was expected, which may have had an influence on the quality of the assignments made.

3. *Cause of poor assignments.* The low quality of some assignments is the result, as a rule, either of carelessness or of lack of professional insight. Even good teachers, who know what an assignment in their work ought to be, allow themselves to fall into perfunctory ways. They will make assignments merely by pages for a time and then suddenly awake and have a series of excellent assignments, only to experience more periods of backsliding and revival. These people are hopeful, for after they are discovered they may be kept up to a high standard by tactful supervision.

Fontaine ('28, 16) cites the instance of a general science teacher who closed her class period with these words: "That will do for today; take the next chapter, 'Heat and the Earth's Crust,' for tomorrow. This is a short chapter, and you can take it all, *omitting the questions at the end of the chapter.*" He tells us that this teacher was using an excellent modern text, but that she did not know how to handle it. Had the text dealt with rules, definitions, and formulæ, she would no doubt have known just what to do. She would then have conducted the class along the old stereotyped memoriter lines and have felt right at home, but a text written from the concrete and problem-solving standpoint she did not understand and it put her all at sea. Fontaine tells us that she was young, which is hopeful, but he also tells us that she had had courses in education at college, which is not so hopeful.

To say that this teacher needs to learn how to assign a lesson is not going far enough. She needs a few other things

first, and if she had these she could very likely figure out herself how to assign a lesson effectively. This teacher needs to discover what science is all about in this day and age of ours, and then she needs to get a first-hand acquaintance with the data and applications of science. That is, she needs first of all to learn some real science, to become enthusiastic about it, and to see how it is functioning in our civilization. After that some real courses in education would help her to put this knowledge and enthusiasm across to the students. Education alone can accomplish nothing; it must be applied to something. The assignment of lessons is only one note in the symphony of teaching, and when it is weak the basic cause is likely to lie in something far more fundamental.

Fontaine ('28, 19) tells also of an American history teacher whose case sounds even less hopeful than that of the science teacher. This teacher had assigned the lesson merely by pages, as is usually the case in poor assignments, and in the class period she was satisfied with brief answers given in the words of the book. There was no discussion, and it is doubtful that the pupils knew what they were talking about half the time. The questions she asked sounded as if they were good, and they were good, but when Fontaine tells us that they were merely the topic headings of the text rephrased in question form, one begins to wonder if the teacher herself appreciated what they really meant. By learning to place these same questions before the pupils in the assignment, this teacher's assignments would be greatly improved, but it is more than likely this would not improve her teaching one bit. Granted that this teacher knows some historical facts, she needs also to learn what these facts mean and what the function of history is in life and education. Next she needs to learn the difference between teaching and lesson-hearing. Then if she could master a few vital modes of classroom procedure, she would

probably have her assignments vitalized as well. The assignment is a part of a larger whole.

The extent to which a lesson-hearing teacher can be transformed into a real teacher is problematical. Every beginning teacher should be given the full benefit of supervisory help, but with all the good educational theory that is available nowadays, and with the excellent teachers that may be observed, the lesson-hearing teacher demonstrates that he is in the wrong calling. The greatest benefit that could befall our schools would be the displacement of each of these teachers by one of the dynamic kind. This would also do away with the oversupply of teachers. Our teacher-training schools must assume the initial responsibility in this matter. The problem is one of selection far more than of training, and our training schools need to develop their selective powers so that those who are by nature not qualified for teaching will not get beyond their doors. Cases that do get by should then be rigidly eliminated in the probation period of teaching.

4. *Coöperative assignment.* A coöperative assignment is one in which the teacher and pupils together raise the problems in the topic ahead. Fontaine ('28, 36) describes one of this type in respect to colonial history. The class was ready for a study of life in the colonies and the teacher started the assignment by asking: "In order to get a clear and full picture of how our forefathers lived, what will it be necessary for us to know?" Among the problems for investigation suggested by the pupils were:

> Let us find out about their houses and the furniture they used.
> How the colonists made a living.
> How about the children in those days?
> What kind of schools did they have?
> Did they have many churches and how did church attendance in those days compare with today?

Here was a teacher who was conscious of history and its meanings rather than of a textbook. The teacher and class in this case were studying history together. There was little formal recitation, but much coöperative discussion.

A form of the coöperative assignment is found in the *developmental assignment.* This is in place whenever an expository topic is being faced and need not be rigidly distinguished from the developmental lesson. There is no reason why the assignment should not merge with other aspects of teaching. After topics like the condensation of moisture and the climate of California have been developed in class discussion, the members of the class are ready to do some intelligent reading. In beginning a study of the cause of day and night and of the seasons, a developmental discussion with the use of a globe may well be undertaken in preparation for textbook study. Where is the earth? What movements does it have? What is its position in relation to the plane of its orbit? What is the result of the rotation on its axis? Why does its revolution around the sun cause the seasons? Is the revolution alone sufficient? Why not?

The answers to these questions should be worked out with a globe in relation to a source of light. After such work, reading on the topic becomes meaningful. In the natural sciences this type of assignment may be used frequently, and it is not out of place occasionally in the social sciences.

5. *Problem assignment.* In expository material, problem assignments have a large place even when coöperative development is not immediately attempted. The topic of the date line may be approached with problems like this: Suppose you started on Wednesday noon and took a trip westward around the earth with the sun, traveling as fast as the sun, you would then have noon all the time, but would it still be Wednesday noon when you got back to your starting-place? Where did

Thursday begin? What puzzled Magellan's crew when they got back to Spain after their trip around the world? Standard time may be approached with similar questions assigned in a challenging manner.

When coming to the topic of specific gravity in physics, the teacher might say: We are now coming to a topic that is not only interesting, but also very old. Hiero, the ruler of Syracuse (about 250 B.C.), had given a jeweler an order for a crown of pure gold. When the crown came, it was very beautiful, but Hiero was suspicious. Was it pure gold? Was it, perhaps, alloyed with silver? Was it merely a baser metal covered with gold? In his perplexity Hiero took the problem to Archimedes. *How could Archimedes determine the purity of the gold without injuring the crown?* This presents a challenge that should direct a meaningful study of buoyancy and specific gravity.

A certain teacher of arithmetic occasionally challenged the attention of his pupils to the topic ahead by including in the final home test one or two problems embodying the rules next to be learned. That always succeeded in attracting the attention of the pupils vividly to what they did not yet know and prepared their minds for further study. In one such class, working on the addition of fractions, one of the boys vigorously objected: "This test was not fair. You gave us two problems you have not yet taught us how to do." Another boy said, "I looked ahead in the book and found out how to do them." The first boy still felt that the test was not fair, but he was relieved when the teacher assured him that his record would not be lowered by his failure to do these two problems. The second boy had initiative and the first one did not, but there was more than one in that class who was smart enough to look ahead and learn how to do the new problems. All the pupils were alert for the development of the next topic.

The review test given after the summer vacation and the pre-test now frequently given when starting in on a new unit are both effective in arousing a consciousness of need. We noted one of the former in connection with the work in arithmetic in the City and Country School (page 305). The six pupils who were not yet sure of their work in fractions and decimals knew what their next assignment was and they went to work on it. A pre-test in history, literature, or any other subject reveals to both pupils and teacher what the next assignment ought to be.

6. *Contract assignments.* By a contract assignment is meant a mimeographed assignment covering the work of a week, a month, or longer. It was given an impetus by the Dalton Plan in which the assignment is usually for a month in advance, but it is used also by teachers who are not following the plan of individual instruction. Even when the assignments cover a month's work, they are usually divided into weekly sections. Obviously great care is required in making these assignments and they frequently take on the form of syllabi. They give the student the advantage of knowing for some time in advance what is expected of him.

The following contract in general science for a six-week period comes from Mr. C. F. Newell, of the Strattonville, Pennsylvania, High School. Class discussions were held but they were infrequent.

SUPPLIES

Two or three copies each of ten textbooks in general science and one reference work like the *World Book*. Apparatus as needed. What is not in stock the students will make.

LIST OF EXPERIMENTS FOR THIS CONTRACT

There are two parts to this contract:

Part 1. *Electric Bells and Bell Wiring*

1. To study the parts of an electric bell.
2. Why an electric bell rings. (Function of parts.)
3. Conductors and non-conductors of electricity.
4. The complete circuit.
5. Study of a short circuit.
6. Bell wiring plan. One bell and two push buttons.
7. Bell wiring plan. Two bells and two push buttons.
8. Bell wiring plan. Three bells and three push buttons.
9. Bell wiring. Apartment house plan.
10. How a bell-ringing transformer is connected.

Part 2. *Cells, Storage Battery, and Electroplating*

1. A simple acid cell and how it works.
2. How to make a sal-ammoniac cell.
3. Study of a dry cell.
4. How cells are connected.
5. How to make a storage cell.
6. How to charge a storage cell.
7. How a storage cell produces electricity.
8. How to test a storage battery.
9. How to plate articles with copper.
10. How to plate articles with nickel.

Outline of the Work Required

You may earn a D, C, B, or A grade by completing successively the work in the following four stages. If you fail to pass the requirement for a D by the end of the six-week period, you will receive an E (failure), but you will be given credit for working, and in later contracts you may be able to bring this grade up.

For a D:

By looking up the subject-matter in the indices of all the references you will find experiments and information which will aid you in doing your experiments. Read all of the subject-matter in each reference, keeping the experiments you are to do in mind.

Make out a list of twenty-five questions you consider most important and write out complete answers. These questions may be taken from the references or you may make them up. They are to be related to the contract and should consist of matter which you consider will be of most importance to you in solving the problems which you will meet in the experiments. At the end of five class periods we will have a class discussion on problems which you and the instructor may bring up. You will then be given a D test which will be made up from problems in the reference books which you have studied. If you pass this D test, you may go on and work for a C. If you fail, you may review for a week and take another D test.

For a C:

You will now work on the twenty experiments in the contract. Be sure you understand the problem in each one before you do the experiment. Also be sure you understand the principle of each experiment. Students may work in groups of two or three or alone. You may start working on any part of the list. At certain points where hard experiments are encountered the instructor may make a demonstration. All experiments must be written up in the approved manner and filed in the laboratory the same day the experiment is done. Do your work carefully. When the twenty experiments are completed and write-ups OKed by the instructor you may go on to B work.

For a B:

Do an approved project. This should be in the field in which you are working. A list of projects will be posted each period. You may do one of these or you may do any other project in which you are interested provided it is first approved by the instructor. As soon as your project is approved you may go on to work for an A. The instructor may ask for a demonstration of your project so be prepared to give one.

For an A:

Candidates for an A rating may be asked to demonstrate any of the experiments in the contract or demonstrate the prin-

ciple of your project. All candidates for an A will be given a test covering experiments done.

Take your time. Work carefully. Be sure you understand the conclusions you have drawn from each experiment.

Contract assignment in Bookkeeping I, given to a junior class in the Ithaca, New York, High School by Miss Ruth A. Bell.

INSTRUCTION TO PUPIL

You are contracting to complete a specific job. Just as a business man contracts to do a piece of work in a specified time and is paid if he completes the contract satisfactorily, you will be given a passing grade if you satisfactorily complete the work which you contract to do in a specified time. As the business man is often given a BONUS for doing *additional work* in the *scheduled time*, *you* may *earn* a *higher grade* by *completing additional work*.

You will receive a bonus, if, after finishing your contract job, you work out problem 125, page 331, in your textbook. Follow the directions in the book exactly as they are.

Length of time of contract — one week — December 7–December 14.

OBJECT OF THE CONTRACT

This contract will familiarize you with making an opening entry, recording all transactions of a business for a month, drawing up a Trial Balance from the ledger, making a Statement of Profit and Loss for the month from the Trial Balance, Adjusting and Closing the books for the month, by Adjusting and Closing entries made in the General Journal, taking a Post-Closing Trial Balance to be sure the books are in complete balance to begin the following month.

GRADES

It is possible for you to earn a grade of D, C, B, A. *The grade you earn* will be *determined* by the *amount of work you complete* and *how satisfactorily it is done.* Below are listed the parts to be completed for each grade.

For a D grade:
All journals completed and balanced, but *not posted.*

For a C grade:
All journals posted and Trial Balance completed.

For a B grade:
Profit and Loss Statement completed — Balance Sheet completed.

For an A grade:
Adjusting and Closing entries completed.
Post-Closing Trial Balance completed.

MARKING WITHIN THE UNITS FINISHED

If the work within a unit is satisfactorily done, the full grade will be given. If any of the following errors occur within the unit, deductions will be made as follows:

Mistake in addition or subtraction, 10 per cent; neatness, 5 per cent; incorrect entry both debit and credit, 10 per cent; only debit or credit wrong, 5 per cent; omission of entry, 10 per cent; transposition, 5 per cent; omission of posting date, 2 per cent; failure to close an account, 10 per cent; insufficient explanation, 2 per cent.

The problem. On July 1, 1931, James Allen began the retail furniture business with assets and liabilities as shown on the balance sheet of June 30. As bookkeeper for Mr. Allen, make the required opening entry and record the following transactions for the month of July, using from books of original entry, journal, purchase journal, sales journal, and cashbook. [The balance sheet and transactions are omitted.]

In *School and Society* for July 18, 1931, there appeared a severe arraignment of the contract plan by Mr. Comish, who had been subjected to it in high-school civics. In his estimation the plan substitutes quantity for quality. It keeps the student eternally busy looking things up and writing them out, but it makes scant provision for the digestion of this material.

Assimilative material is accumulated, but basic meanings and adaptations are neglected. This is quite likely to be the result when illuminating class discussions are minimized and grades are assigned largely on the amount of writing that has been done, so much for a D, so much more for a C, and so on to B and A.

That the contract plan may easily make the student's work mechanical is obvious. No plan of assignment can compensate for the guidance of a teacher who is continually assisting the pupils to distinguish the few things that are primary from the many that are secondary, and who is helping them to develop criteria for doing this for themselves. It is not to be expected that a high-school student will use refined powers of discrimination when going over a field of knowledge for the first time; it is only the rare adult who can do that, and then only when he is in possession of a background acquired from other sources.

Mr. Newell's pupils in general science were keenly interested, they worked with enthusiasm, and they acquired an understanding of the units covered.

Before the monthly contracts in a Dalton school are given out to the students, they are first considered in a meeting of the staff. The assignments of the various teachers are correlated and overlappings are eliminated. The work in art and in English, for example, is related to that of every other department. This is an excellent idea and need not be restricted to Dalton schools. It gives each teacher a chance to know what the other teachers are doing and to adapt his work accordingly. This presents a rare professional opportunity to the principal. In every departmentalized school the teachers need to work as a team, as one ideal individual. It is one of the functions of the principal to bring this about.

7. *Setting and assignment.* In history and literature, and to some extent in other subjects, the development of a setting

for the topic ahead often forms an important phase of the assignment. The introduction of Archimedes into the assignment on specific gravity is an instance of setting. Fontaine's assignment on the crusades ('28, 29) includes a setting. What were the conditions in Europe that brought about the crusades? Who had possession of the Holy Land? Why should this have brought about crusades in the twelfth century, but not in the nineteenth?

Miss Ten Broeck, of the Ithaca, New York, High School, made the introductory assignment on Shakespeare's *As You Like It* approximately as follows:

> In order to understand and enjoy this play we must turn back our pages of history to the time of Shakespeare, more than three hundred years ago. What was going on in England at that time? What were the people thinking about? What were the theaters like? Where were Shakespeare's plays first given?

Brief assignments for report were made on such topics as:

> The Globe theater in the time of Shakespeare.
> Mode of travel in the time of Shakespeare.
> Dress in the time of Shakespeare.
> Political events in the time of Shakespeare.
> The Drama before the time of Shakespeare.

After each student had chosen a topic, the teacher gave helpful suggestions for references to be consulted in the library. Appropriate pictures, dolls dressed in the period costumes, and a model of a theater made by former students were shown.

In literature, as in the other fine arts, the matter of assignment may easily be overdone. Often the setting is enough. A few questions on the theme may usually be raised with good effect, but questions on the technique are likely to detract the attention away from the theme.

8. *Motivating assignments.* The setting helps to motivate

the assignment, but this is true also of problems, contracts, and other tasks. All prospects of expansion in experience are alluring. An assignment that presents a challenge is thereby motivated. In vocational subjects, in the motor arts, and to some extent in the natural sciences, practical worth may be enlisted in motivating the assignment, but in general education the theoretical motives must be relied upon for most of the specific motivation. To grow in understanding, to expand in sympathy and appreciation, and to increase in skill are inherently interesting. No special problem in motivation is presented by the assignment.

9. *Definiteness.* Definiteness in assignment is secured by making sure that the questions, problems, and procedures that are raised are clearly understood, and that they are before the student when he is studying. The first point may be assured or furthered by a discussion of the questions assigned and the second by having the assignment in written form or by having pupils underline parts of their texts.

When teaching physics in high school some years ago, the writer started in by making his assignments orally in class. He thought he was making them clearly and fully, yet the next day many of the points raised had been missed by the pupils. He finally decided to place the assignments daily on the blackboard in the study hall, which brought about decided improvement in the quality of the preparation.

In most high schools the written form of the assignment is attained by having the pupils carry assignment books in which the assignments are copied either from dictation or from the blackboard in the classroom. Other teachers use hectographed sheets. Extensive assignments, such as contracts and work sheets, may well be duplicated for the pupils. They are awkward to handle and require a portfolio or a large loose-leaf notebook.

While definiteness needs to characterize assignments always, the nature of this definiteness may vary greatly from the kindergarten to the graduate school. The senior college student should be able to handle large problems, working out the details for himself, but this cannot be expected of a third-grade pupil. In general, assignments may become less and less detailed as we proceed upward in the school system, and as we deal with abler as compared with less able groups. Assignments in Z groups need to be more detailed than those in X groups. A young man doing practice teaching in a Z group of fifth-grade children in geography assigned the next lesson by saying, "For tomorrow take pages 18–42, *and see that you know something about it.*" The recitation just closed had been terribly hard sledding, but his assignment could not be expected to smooth the way for the next day. Granted that these pupils should have been studying geography formally from a textbook, it would have been necessary to assign a specific question for every point to be learned and it would have been necessary for the pupils to write out the answers to these questions while they were studying. With an abler and more mature group, one problem, such as we noted in connection with specific gravity, may occasionally be of sufficient scope and definiteness.

10. *Time for making assignments.* The time during the class period when the assignment should be made depends upon the type of assignment the teacher has in mind. The teacher who proceeds by means of large units can and should make his major assignments at the beginning of the period, even though the discussion of the preceding unit has not been quite completed. Enough will have been done to furnish the needed background. This gives the teacher time to bring out the significance of the next unit, to raise the problems involved, and to suggest references and activities. Time required for

making such an assignment should never be grudged or skimped, because good assigning is good teaching.

After the basic assignment has been made, which may occupy the class for days or weeks, supplementary assignments may be made as needed. The time in the period is immaterial, except that it has been demonstrated over and over again that teachers who leave the matter to the end of the period seldom allow themselves time enough.

11. *Planning subject-matter.* The assignment of lessons is a phase of the planning of subject-matter as a whole. This leads us right back to the learning unit, the interrelation of units, and the organization of knowledge, topics that we have already discussed. It is quite obvious that the teacher needs a conspectus in his own mind of what he expects to achieve in a course; that is his road map or blueprint; but there is no need of repeating here what has already been developed. In the assignment of work, in the lesson plan, and in classroom procedure, subject-matter and pedagogical theory come together in the teacher's hands for the guidance and stimulation of learning on the part of the pupil.

12. *The lesson plan.* The planning side of teaching culminates in the lesson plan, of which the assignment is an integral part. Teachers, like other professional workers, need to plan what they are going to do. The lawyer plans his case, the minister plans his sermon, and the architect plans his structure. One does not employ an architect before seeing his plans. Similarly, one would have a right to ask for a teacher's general plan for teaching literature, physics, French, or any other subject before engaging him. The reason why experience is so generally demanded is also, in part, to get a line on the teacher's plan of procedure. The plan, especially when explained, reveals the worker. All intelligent work requires planning in order to be effective.

Teaching includes both subject-matter and method and the lesson plan must cover both also. To make sure that nothing essential will be overlooked is one of the functions of planning. To this end some teachers find it helpful to have at hand a check list of the items that classroom procedure may include. In general, the table of contents of a textbook on teaching should constitute such a check list, for it is in the lesson plan that pedagogical theory is brought to a focus just before it is applied. The following may serve as such a check list:

I. *Subject-matter*
   1. Type
      a. Knowledge
      b. Appreciation
      c. Motor control
   2. Objectives
      a. Educational — function in life
      b. Teaching — specific control to be mastered

II. *Method or procedure*
   1. Mode of procedure
      a. Direct or psychological attack
      b. Development — inductive or deductive
      c. Narration, description, exposition
      d. Summaries, organization
      e. Setting for appreciation
      f. Devices for use or drill
   2. Supplementing the text
      a. References for pupils
      b. Specimens, pictures, etc.
   3. Pupil activity — dramatization, handiwork, etc.
   4. Motivation
   5. Assignment

That this list bears a close relation to the outline of this book is obvious. The list may readily be modified to meet

the needs and tastes of any particular teacher. No one lesson or unit will require the use of all of the items mentioned. A unit in literature would fall under the appreciation type, with the knowledge background represented by the theme. This theme might call for some expository discussion and for the story. The setting would have to be developed and attention might have to be given to the provision of student activity. Items 2, 3, 4, and 5 under II are mainly reminders. Without them the teacher is likely to overlook something. Many a teacher fails to use illustrative material because he does not think of the need of it until he gets into the midst of the lesson, when it is too late to get it. The use of a check list might have saved him.

The mode of attack that the teacher adopts depends on his general plan of procedure. The direct attack requires the psychological approach with the realities of subject-matter and pupil activities in the foreground. Pupil participation will make the procedure meandering. All this demands careful planning so as to keep from going off on tangents. Bringing the matter together into a coherent whole later on requires further careful planning. The fixing of knowledge and appreciation through use, as against drill, calls for an especially high type of planning.

The teacher who merely follows a textbook or a subject-matter outline needs very little planning, but the genuine learning that he induces is, as a rule, correspondingly meager. Planning a psychological approach through motor and mental activities may seem slow to the scholar, but it constitutes the path of vital learning. Logical systematization has its place later on as the capstone of the learning process.

It is assumed throughout in this discussion that lesson planning should proceed by units rather than by daily lessons. On no other basis can coherence and meaningfulness in instruc-

tion be maintained. Naturally, when a unit is not covered in one class period, supplementary planning must ensue.

The extent to which lesson plans need to be written out depends on the purpose for which the writing is done. If the plan is merely for the teacher's own use, with no one else to see it, very little writing needs to be done; if the plan is for the supervisor's inspection, so that he may intelligently assist the teacher, more needs to be written.

In practice teaching it is usually expected that the cadet teacher will write out his plans fully. Many supervisors demand that this be done in double column, one for the subject-matter and one for the method of procedure.

The subject-matter column should contain:

1. The grade in which the teaching is to be done.
2. Time and place of the lesson.
3. The topic of the unit or lesson.
4. Aim or function of the unit.
5. Page references, including the text, for pupils and teacher.
6. An outline of the unit.
7. A digest of the unit.

Writing out a digest of the subject-matter assists the supervisor in understanding what the cadet is attempting to teach, but its main purpose is to assist the cadet in gaining command over his content. As this command develops, the digest may be curtailed and finally omitted, the outline being accepted as sufficient.

The methods column should contain:

1. A brief statement of the general plan of procedure as, developmental, expository discussion, reading for appreciation, drill, use, written test, etc.
2. An outline of the procedure, including pivotal questions to be asked, experiments to be tried, pupil activities to be enlisted, supplementary material to be used, etc.

Lesson plans in practice teaching should, of course, be checked over, modified if necessary, and approved by the supervisor, before they are used.

The teacher who is just entering the service or who for any other reason is under close supervision may be expected to write out similar plans, but as his efficiency develops or is demonstrated, he should be relieved of this burden. For the supervisor who may wish to know on entering the room what the work in hand is about, the teacher may prepare brief statements of the subject-matter to be covered. These statements may be entered daily or weekly into a plan book placed conveniently on the teacher's desk.

When new work is undertaken and when a new textbook is being worked up, it is excusable for even experienced teachers to make use of written notes while teaching, but in general it is a good policy to work away from notes. The teacher who knows his subject-matter and who carries his plan of procedure in his head has a tremendous advantage. It gives him a freedom and a sense of mastery that enable him to add materially to the effectiveness of his teaching. Notes in hand are a crutch and they have the effect of a crutch. The lawyer, the minister, and the public speaker face the same problem. The person who can speak from the fullness of his knowledge and convictions without notes is likely to make a more effective impression than the person who has to lean upon a manuscript or notes.

The absence of notes in the classroom need in no way imply that the teacher has not planned his work; quite the contrary. He may even have used his pencil extensively in getting ready for his class.

Economy of time suggests that elaborate plans placed in the hands of students, such as contract assignments covering a period of weeks, should be saved and used again with future classes, but there is much to be said for discarding other plans

after they have been used once. Unless the teacher does this, he is likely soon to find himself in a hopeless rut. Even should next year's plan coincide closely with this year's, making it afresh would have had the effect of refreshing the teacher; it would have made the subject-matter seem new. Teachers should, however, consciously aim to plan their work differently from year to year; they should experiment with different modes of procedure. This not only contributes to the maintenance of interest on the part of the teacher, it constitutes also the main avenue of professional and technical growth. The new plans and devices continually appearing in our professional literature can be appropriated in no other way. Merely hearing or reading about them need in no way modify one's practice.

13. *Summary.* The planning of subject-matter, the lesson plan, and the assignment are all aspects of a larger unit in applied educational theory. They crystallize the thought that the teacher puts forth for the stimulation and guidance of learning. The heart of the assignment and the heart of the next lesson plan coincide. Although only an element in a larger whole, the assignment, as such, is deserving of most careful thought. Its problem is to get pupils started on their work with a realization of its significance and a vision of what they are to achieve. The assignment must challenge the attention, captivate the imagination, and blueprint the procedure.

EXERCISES

1. How may assignments be adapted to individual differences among pupils?
2. Suppose the assignment is covered before the class period is over, then what?
3. Are the teacher's aim and the pupils' aim in a lesson necessarily different? How may they sometimes be distinguished?

4. In the contract assignment in bookkeeping, is the analogy between a bonus in business and a higher mark in school sound?
5. What is your impression of differential assignments, as exemplified by the contract assignments in general science and in bookkeeping?
6. In which class, the principles of teaching or observation and practice, may assignment and lesson planning be more effectively studied? Why?
7. About how much time per day should high school pupils spend on each major subject? How may assignments be planned to fit this time?
8. Prepare an assignment for one short unit in history. Prepare a four-week contract assignment for a high school class in your major field of interest.
9. What questions may be written out in the lesson plan? Why is it more important for the beginner than the experienced teacher to write out these questions?
10. Give three instances in which you as a student were handicapped because of faulty assignment. Give three instances of good assignments from your experience.
11. "After a long experience with lesson plans and the writing of plans by students, the writer has come to the conclusion that the less formal they can be made, the better for all concerned." (Charters, '12, 415.) Are supervisors asking for too much in lesson plans?

SELECTED READINGS

On assignment:

Burton, W. H. *Nature and Direction of Learning*, 445–465.
Charters, W. W. *Methods of Teaching*, 396–413.
Douglass, H. R. *Modern Methods in High-School Teaching*, 48–61.
Earhart, L. B. *Types of Teaching*, 80–92.
Fontaine, E. C. *Ways to Better Teaching*, 22–45.
Monroe, W. S. *Directing Learning in the High School*, 414–423.
Porter, M. P. *The Teacher in the New School*, 39–57.
Simpson, M. E. *Supervised Study in American History* (a book of helpful lesson outlines).

On planning:

Burton, W. H. *Nature and Direction of Learning*, 557–583.
Charters, W. W. *Methods of Teaching*, 415–434.
Douglass, H. R. *Modern Methods in High-School Teaching*, 69–99.
Earhart, L. B. *Types of Teaching*, 220–235.
Monroe, W. S. *Directing Learning in the High School*, 539–564.
Mueller, A. D. *Teaching in Secondary Schools*, 380–397.
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CHAPTER XXI
THE CLASS PERIOD

1. *Functions of the class period.* The recitation in the traditional sense is passing, but this does not imply that meetings of classes with teachers are ceasing to be. It is not likely that these will ever pass, for they are too valuable. Lesson hearing can be done with individuals, but teaching is much more effective when done with groups. The group inspires the teacher as no individual can, and the discussion that accompanies good teaching is enlightening and stimulating to both teacher and students. No one person is likely to think of all significant aspects of a subject. Even students who have prepared their work conscientiously usually find that the class discussion brings out points that had not occurred to them, and in most classes this holds also for the teacher.

For a number of years I have asked my college classes how they feel about reducing the number of class meetings and doing the work more on an individual basis. The opposition to such a proposal has always been vigorous and practically unanimous, and the students are ready to cite cogent reasons for their position. The class meeting is a clearing-house and they feel that much would be lost if it were given up. I have found that college students are willing to cut only those classes that are not worth attending.

Class meetings are needed for a number of reasons. (1) They set specific goals of achievement. There are few people who are able to keep themselves systematically at work without having definite tasks to complete by a given time. This is the way of life outside of school and it is welcomed in school, granted always that the work is significant and that definite

progress is being made. (2) Class discussion is one of the things that complete the circle of learning. Impression requires expression. Without it the learner himself does not know what he knows and it is not fully his own. Even listening to the other members of the class has this effect. (3) Participation in discussion is stimulating to the personality development of the student, both intellectually and emotionally. The student who has contributed to a discussion has been given a stimulus to further study and thought, he has been given an added view of himself, and his own feeling of worth has been expanded. Listening to the contributions of others often causes the student to realize his own limitations and to point out ways of improving them. (4) Class discussion clears up difficulties. Some of these may be specifically called for by the students; others come up incidentally and may not even have been suspected by most of the class. The experienced teacher has learned what to bring up in this connection and has very likely directed attention to possible difficulties in the assignment. (5) The class period is the time for supplementing the text and for pooling the special contributions of the students. The more individual students and committees pursue special investigations, the more class meetings are required to make the results available to all. Specimens, experiments, and pictures are often most economically studied together in the class period. (6) The class period is the time for ferreting out relationships and organizing knowledge into meaningful wholes. This is an indispensable yet difficult aspect of learning and few students can make much headway in it by themselves. It presents one of the greatest opportunities for constructive teaching. (7) Group experience and discussion are especially effective in literature, art, and music. Here the collective appreciation of all enriches the appreciation of each. (8) Class conferences contribute significantly to

economy in education. What needs to be done for one serves for many or all.

It is clear from the foregoing discussion that the type of class work assumed goes far beyond the reciting of what has been studied in a textbook. Warren D. Parker, the impressive president of the Normal School at River Falls, Wisconsin, used to say that it was the function of the class period to restudy the lesson, teacher and class working together. It is, above all, a thinking period. But this is not saying that reciting, or oral testing, has entirely disappeared. It has been overshadowed, but it is not absent. The testing may be incidental, but it is still there. Students should feel an obligation to come prepared on what has been assigned, for that is the point of departure for the restudy of the topic together. The student who has not done his work is not only at a loss himself, but he retards the group. The work of the class period should proceed from a point distinctly beyond the elements of the topic in hand. Unless that is the case, either the study period or the class period is needless.

2. *Types of class work.* The type of work that is done during the class period depends upon the type of subject-matter that is being mastered. The various procedures that these types imply were indicated to some extent in Chapters IV to XIV. The topics of these chapters are sometimes called types of lessons. That designation is not very appropriate because lesson procedures may vary rather widely for the same type of subject-matter.

Relationships, which include principles, laws, rules, and definitions, may be taught either according to the five-point outline by the developmental procedure or according to the four-point outline by the study and expository procedure, as brought out in Chapter VI. Descriptive and narrative topics may be learned and recited, but they can be taught only to the

extent that they involve relationships. No facts, however, even when they form the basis of narration and description, are entirely out of causal connection. Geographic features, such as mountains and plains, may be described, but they are also the result of causes that brought them into existence. In turn, they exert a causal influence on the weather, vegetation, and human industries. History is concerned no less with the causes of events than with their succession in time. A painting exists in spatial attributes and in lights, shades, and colors that may be described, but of greater significance are the meaning of the picture and the esthetic principles underlying its production. The facts of narration and description do not stand by themselves, but are related to values, meanings, and explanations. This makes it not illogical to designate all the teaching procedures that involve the four-point outline as expository. The type of teaching they call for is expository.

The procedure that we have called development goes also by a number of other designations, of which the student needs to be aware. The leading ones are: the Socratic method, the heuristic method, the method of discovery, and the conversational method. These are all synonymous and to attempt to make distinctions between them is artificial and unprofitable. The developmental procedure involves discussion, but discussion is not restricted to development; it may be present in all forms of teaching.

The procedures that are helpful in developing, organizing, and fixing knowledge are sufficiently discussed in Chapters IV to VIII and XIV and XV.

The classroom procedure in literature, art, and music is now frequently quite similar to that in natural and social science, but the wisdom of this may be seriously questioned. To the extent that a knowledge of facts and principles is required to

understand an esthetic situation, to that extent factual discussion is in place, but the basic discussion in these fields must revolve about values and significance. The esthetic subjects are not science; they are suggestive, inspiring, and directly pleasing, but they do not demonstrate anything. After one has read a literary selection, seen a picture, or heard good music, he usually wants to talk it over with someone. That suggests the type of discussion that is appropriate in this field. Let the pupils bring up those points that they want spontaneously to tell someone about. That reveals both the art and the speaker.

Group enjoyment has a larger place in the esthetic subjects. That is why leading teachers in these subjects spend much time reading to their classes, listening to music, and viewing works of art. Remarks may be made by anyone present, but the attention is not on facts so much as it is on meanings and enjoyment. The spirit that should prevail is essentially the same as that in which these arts function in life. This is also the spirit in which these subjects should be studied outside of the class period.

In developing motor control, which involves such subjects as manual training, drawing, painting, penmanship, musical skill, cooking, and sewing, the laboratory procedure, which is largely individualistic, applies in the main. To insure a correct start, group work has a place at the beginning, but after that class discussion is needed only occasionally. It is needed whenever points of common interest need to be cleared up. In developing skill and confidence in pronouncing a foreign language, concert work is effective. It gives even the most diffident confidence to join in.

3. *The "socialized" recitation.* The class period in which the teacher and pupils work heartily together has since about 1915 been called the *socialized* recitation. Its leading char-

acteristic is *coöperation*. Beginning with the assignment, the teacher and pupils assume responsibility jointly for planning, studying, and reporting the work. The developmental assignment is coöperative, but other assignments may be coöperative also. When a class in geography, for example, participates in selecting the topics in respect to Russia, Italy, or Spain that it would especially like to study, the assignment is obviously coöperative. In history, literature, and even in working out the applications of mathematics and the natural sciences, coöperative assignments are in place.

Whenever a subject presents so many aspects that no one pupil can cover them all in detail, then coöperation on special topics is in place. These special topics may be worked up either by individuals or by committees, and the responsibility is not primarily on the teacher, but on the class. This responsibility is a real one, for the other members of the class desire the information gathered in the special reports and depend upon getting it from that source. The making of reports so that they are worth listening to is splendid training. Cooperative work, however, is not limited to working up special reports. It holds in all group projects, such as dramatization, giving an entertainment, building a playhouse, and preparing a meal.

When the "socialization" of school work first started, it was taken by some teachers to mean that a pupil instead of the teacher should be given charge of the class. If coöperation can be attained best in that manner, it is in place, but the abdication of the teacher is not required for a fine coöperative spirit. In fact, the teacher is the appointed leader in the schoolroom and can at best only delegate his powers. The pupils naturally look to him for leadership, which is their right. But the skillful teacher can delegate a great deal, for the educational benefit of the pupils.

4. *Place and function of outlines.* Using the five-point outline, the four-point outline, or any other outline of a learning act in teaching is very different from following it point by point. This has been brought out in previous chapters, but it is worth reiterating. The fact that mediocre or half-trained minds in all lines tend to follow outlines slavishly constitutes a real danger in letting professional theory ever culminate in outlines at all. An alert rule-of-thumb procedure is much to be preferred to the stupid following of a splendid outline. Yet, full-fledged professional practice cannot be attained except through the conscious use, initially at least, of theory that has been summarized. When fully assimilated, outlines function from the background of consciousness. They serve as criteria for judgment which enable the teacher to make progress and to keep on the main thoroughfare. The procedure itself may be highly circuitous; it moves from chaos to system, or from the psychological to the logical, so-called.

The outlines of which we are speaking are outlines of educational theory and not of academic subject-matter. They are summaries at which the teacher of the principles of teaching may arrive, but may not be identified with the summaries toward which teachers of history, geography, physics, and so on, are working. Summaries are peculiar to the content to which they apply.

5. *Questioning.* The formal question-and-answer method of teaching is passing with the formal recitation, to which it belonged, but questioning of some sort is involved in all forms of teaching. It is a topic to which all teachers in training should give some attention, if only to help them to become reflective in respect to the matter. Framing an effective question is an art, and, as is frequently the case in the arts, there is little of a theoretical nature that one can say to help the beginner to perfect the art. In respect to procedure in

questioning, which involves other things than the nature of the question itself, more can be said that may be helpful.

Questioning may be likened to shooting at a mark. Unless one has the gun aimed straight at the mark, the shot will miss. So, unless the question aims straight for the item of information desired, the question is not likely to fetch. Some allowance may be made for the intelligence of the questionee, but not a great deal. The questioner had the goal of the question in mind even before he asked it, but the listener must infer this goal from the question. When the question is one of a series, the context being discussed may help the listener, but when the question is an isolated one, he has nothing to go by but the question itself. Just to realize this fully is enough to serve as a stimulus to give thought to the clearness of questions. When a third or more of a class misinterpret a question, as happens rather frequently in written examinations, the fault cannot be laid to the students. Such a question should either be thrown out or the students should be given credit for their interpretation.

Charters ('12, 304) tells us that questions should (1) contain no irrelevant material, (2) that they should contain all relevant material, and (3) that they should be understood by the pupils. Mueller ('28, 125) tells us (1) that questions must be clearly worded, (2) that they should be free from the exact wording of the book, and (3) that they must take into consideration the age, maturity, and ability of the pupils. These criteria mean little more than that questions should be clear and unambiguous.

When we know the subject-matter, we have no difficulty in recognizing a question that is clear, yet to frame a clear question may prove to be difficult. Into what sub-groups may human beings be divided? is far from clear because the basis of division is not indicated. On the basis of skin color, into

what main groups may human beings be divided? is quite clear.

The framing of questions so as to be clear and unambiguous depends first upon the questioner's knowledge in the field concerned and next upon his skill. The matter must be left primarily to him.

From the standpoint of the type of subject-matter involved, questions may be divided into fact questions and thought questions. Fact questions call for data and thought questions call for relationships. It is sometimes assumed that thought questions are more significant pedagogically than fact questions, but that need not be true. Before one can trace relationships, the data must be clearly in mind.

From the standpoint of the amount of subject-matter called for, questions have been divided into piecemeal and topical. These two must usually be used in sequence, piecemeal questions coming first. Topical questions are summarizing questions. No pupil should be expected to give a topical recitation on a complex topic till after the details of the topic had been studied. No sixth-grader should be asked to give a rounded discourse on the Rocky Mountain region till after the separate characteristics of this region have been brought out.

From the standpoint of purpose, questions may be divided into learning questions, teaching questions, and testing questions. A person asks a learning question when he is seeking information that he does not have. Which road do I take to go to Cortland? How far is it to Auburn? are questions that the motorist may ask in all sincerity. Pupils should be encouraged to ask this type of question, and the teacher himself should not hesitate to ask it of members of the class. All are seekers after knowledge, and it contributes a fine morale to the class when the members realize that the teacher is also learning.

Questions that are asked in a development lesson are teaching questions, and questions asked during an oral or written examination are testing questions.

The sequence of questions is determined by two basic factors: (1) the nature of the subject-matter, and (2) the order of attack that the teacher has planned. The first recognizes the logical, and the second the psychological, aspect of teaching. The teacher who taught latitude and longitude as outlined in Chapter VIII made a psychological attack, and the first questions he asked bore no obvious relation to the topic in hand. The nature and order of the later questions, however, were determined by the subject-matter. There is no one and only order of unfoldment in any subject, which makes it possible for every teacher to plan his own series of questions. Having planned it, even the most unexpected answers and counter-questions are not likely to lead him far from his path.

The fact that class work is primarily coöperative group work, and only secondarily individual, sets up a number of standards that are well to keep in mind when beginning to teach so that proper habits of procedure may be inaugurated.

Ask your question first, and then, after a pause, designate someone to discuss it. This gives all an equal chance to think and is embarrassing to none. To say: "John, stand," and then fumble around for your question is enough to embarrass any John. The others feel relieved of all responsibility and look upon John as the victim.

Distribute your questions promiscuously. Right at my office door a few years ago, I overheard one student take another student (both teachers, by the way) seriously to task for having been absent without notice from a foreign language class the period before. This upset the plans of a considerable number, who had to work like Trojans after the class started so as to be prepared when their turn came. Study time is

precious and students economize it whenever they can safely do so. This, however, can easily be avoided by adopting some device for distributing questions promiscuously. Calling on pupils from cards which are frequently shuffled achieves this purpose very well. Such cards also achieve the goal of giving all members of the class an approximately equal number of opportunities to participate. Participation in class work is a privilege. Quite unintentionally, some teachers are likely to let a few members of the class do nearly all the talking day after day. Cards need not stiffen the procedure when used tactfully. In a lively discussion the cards may well be forgotten for a time.

Many persons who begin their teaching without supervision acquire the habit of repeating every answer that pupils give. This is universally looked upon as bad teaching form because it tends to destroy the coöperative attitude of the class. Instead of listening to one another, the members of the class need to listen only to the teacher.

The tendency to form this habit has several causes. The beginning teacher is nervous and feels that something should be going on all the time. Repeating what the pupil has said fills the gap between questions. Another cause is found in noise coming from outside of the school. Still another arises from the way students are often seated during the discussion period. When they are seated in a deep and narrow formation, those in the rear cannot hear what those in front are saying. The most deepseated cause, however, is the tendency for a person to repeat what he has just heard. It helps him to take it in. Children do this quite noticeably, but most adults have suppressed the process to the extent that they are seldom aware of it themselves. The teacher needs to realize that the pupils are engaged in the same process of repetition and that it is not necessary for him to think out loud in order to assimilate

and evaluate the answer. Once the habit is well established, it is hard to eliminate. The teacher feels that something is missing when he does not repeat the answer, and this upsets him.

For a teacher to summarize occasionally what has been said so far, or to repeat a part of an answer to attract attention to it for some reason, should not be classed under the habit of repeating answers.

Some teachers adopt the mannerism of stating a question in several different ways before putting it to the class. They do this either as a means of calling the class to order or because they have not given thought to the wording of the question beforehand. In either case it conduces to inattention. Unless there is a good reason for it, such as an unexpected noise, a question that has been clearly and distinctly stated should not be repeated. If the student whose name comes next has been inattentive, the question should be passed to the next one on the list. No comment of any kind is needed.

In conducting a lesson by means of questions, every student should be given a fair chance to make his contribution. To this end it may be necessary to ask him several more questions, but it is a waste of precious time to pursue a student for many minutes in order to drag an answer out of him that he is either unable or unwilling to give. I was a member of a class in education one time that was held marking time for two days because no one could make a certain interpretation that was desired by the teacher. Finally someone guessed it and then we proceeded. The point was a minor one and there was no reason why the teacher should not have supplied it after a few minutes of blocked discussion.

Teachers in elementary and secondary schools used to be meticulous about requiring complete sentences for every recitation. That is a formalism no longer in good grace. Good English may be insisted upon, but let it be as natural as that

used in the home or on the street. One word or a nod is often an adequate answer.

It used to be insisted upon, too, that pupils should address their answers to questions to the class. That is unnatural and makes the student feel foolish. In life we always address the answer to the person who asked the question. Nothing else would be courteous. If a group is in a discussion, each one aims to speak loud enough for all to hear. There is no sound reason for any different procedure in school. A report of some length is different. That should always be addressed to the class, but when this is done, the teacher should take a seat in the class. Unless he does this, the audience is divided and the speaker keeps turning from one to the other.

Teachers are learning more and more that a spirit of naturalness is a helpful asset in the schoolroom.

EXERCISES

1. Give three examples of leading questions. Why objectionable?
2. When are "yes" and "no" questions satisfactory and when not?
3. Give examples of two catch questions. Are such questions always objectionable?
4. Give two examples of double questions. Why are such questions objectionable?
5. What is meant by adapting questions to individual differences? How may this be done?
6. "Who chased whom around the walls of what?" is often cited as an obscure question. Is it?
7. Students sometimes plan to sidetrack the teacher from the topic assigned. How can the teacher avoid falling into the trap?
8. What criticisms can you offer against "Discuss" and "Tell about" questions? How could these questions be made more specific?

9. What objections may be raised against entering a mark every time a student has recited? How may marks for classwork be ascertained?
10. "The present discussion deliberately omits classified listing of question types. They are of little or no value." (Burton, '29, 467.) Do you agree?

SELECTED READINGS

On class procedure:

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On questioning:

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Charters, W. W. *Methods of Teaching*, 296–311.
DeGarmo, C. *Interest and Education*, 179–204.
Mueller, A. D. *Teaching in Secondary Schools*, 117–133.
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CHAPTER XXII

MEETING INDIVIDUAL DIFFERENCES

1. *The problem.* Simultaneous instruction in classes would solve the problem of economy and efficiency in education *if* all pupils were approximately equal in capacity and disposition to learn, but they are not. Pupils differ widely in both capacity and interests. Teachers have always known this and have always allowed for it in educational guidance, but it has remained for the precise measurement of these differences within the last generation to reveal their full extent. In an ordinarily graded class of normal children, the highest ten per cent can do from two to four times as much work as the lowest ten per cent, or they can do it from two to four times as well. Among individual pupils the difference is often still greater (Thorndike, '06, 73). This obviously makes straight class work a poor fit in some important particulars. It introduces what has come to be known as the "lock-step" in education. The pace for the class is set by those in the middle range of ability. With this pace the weaker students cannot keep up. They fall behind in their work, become confused and discouraged, and many of them fail. The abler students find the pace too slow. They waste much time, they get into mischief, they form the habit of dawdling, and they fail to acquire the priceless ideal of working up to capacity.

With the extension of compulsory education into the period of adolescence, this problem of meeting individual differences and individual needs has been brought even more into the foreground. Different needs must be provided for by different curricula, as is gradually being done, but in addition to this, class work must be modified or supplemented so as to give

each pupil a fair chance to achieve in accordance with his capacity.

2. *Ability grouping.* The solution of this problem that is suggested by the foregoing lines is that of ability grouping. Why not teach the best, the median, and the slow pupils in separate classes? This is now being extensively tried. Where numbers in the same grade of work permit, classes are divided into three sections, designated usually the X, Y, and Z groups. These are taught by teachers who have, in many cases, made a special study of the range of ability to which they are assigned.

The development of mental and educational tests has been a great aid in segregating pupils into ability groups, but evidence is not restricted to these tests. This evidence includes: (1) mental test scores, (2) achievement test scores, (3) school records, (4) teacher opinion, and (5) parent opinion. To these should often be added evidence from the school or family physician. Teacher and parent opinion are needed because our mental tests do not yet measure personality traits which are often significant. A child that is personally immature may have his right place in the Y group even when both the mental test and the achievement test indicate that he could technically do the work of the X group. Similarly a child that is personally mature or that is overage might be given the benefit of a doubt on a higher classification.

In no case, however, are the segregations once made rigidly adhered to. Pupils are moved rather freely from one to another, as their needs seem to demand. This is to be expected from the nature of the distribution of abilities. These abilities do not fall into distinct groups, but vary continuously in accordance with the normal surface of frequency. This means that in every group there are likely to be pupils that are either on or very near the borderline. Furthermore, no matter on what basis the division into groups is made, the

groups overlap greatly in all other characteristics. See, for example, Whipple '25, 141 f. Miss Keliher ('31) concludes that "the sorting of individuals into 'homogeneous' groups does not produce the expected reduction of variations even in the measured traits" (page 161), and that "homogeneous grouping, as we now have it, seems undesirable" (page 162).

In respect to ability grouping in the Detroit, Michigan, schools, Courtis says:

> From the outset it was realized that no classification by tests can be absolute. Teachers and principals were privileged to change children from one division to another in accordance with their actual success in school work. Actually it has been found necessary to change the placement of less than forty per cent of the children.
>
> The X–Y–Z plan contemplates a differentiated course of study; the regular course for the Y's, an enriched course for the X's, and a simplified course of minimal essentials for the Z's covering exactly the same ground. Experience has shown that mere change in amount of ground covered is not enough. Further, there appears to be need for differentiation of teaching methods as well as for differentiated courses of study.
>
> The practice begun in 1920 has been continued ever since. Intelligence testing and sectioning on the basis of ability has spread to the intermediate schools, high schools, and colleges, until today (1925) the intelligence factor is given consideration throughout the system.
>
> Evaluation of the effect of sectioning on the basis of ability has been difficult because of the number of factors influencing test results. Careful experimentation has yielded conflicting data. But in the informal and more inclusive judgments made by principals and teachers, the trend of opinion is decisive. Sectioning on the basis of ability increases both the efficiency and the pleasure of teaching, and is a valuable addition to our grading system because it makes possible a closer adjustment of group work to children's needs. (In Whipple '25, 45.)

3. *The study coach.* In all schools, including those in which

ability grouping has been adopted, pupils will fall behind and will stand in need of individual help in order to catch up. The pupil may have been out on account of illness, he may have entered late, he may have been transferred from another school system, or he may for some other reason find it difficult to keep up with his class.

In most school systems the class teacher assumes the responsibility for bringing these pupils up to standard. He will help them after school, during recess, or at any other odd moment. This needs to be looked upon by teachers as one of their professional duties, no less than the teaching of classes. In fact, we need to develop the conception that the teacher's responsibility is always primarily to the individual rather than to the class. This holds for a class of five hundred no less than for a class of five. A college lecture, like the teaching exercises in an elementary or secondary school, is only a means of reaching individuals. Most of these will usually be reached, but those that are not should always feel that it is their privilege to come for individual assistance. When the teacher through tests discovers individuals that have not grasped the ideas presented, it becomes his duty to take steps toward remedying the deficiency. Teachers share with the students the responsibility of mastering the subjects in hand, although as we advance in the school system this responsibility should be shifted more and more to the student. The brilliant student will always get along, but it is encouraging to him for the teacher to manifest some personal interest in his work.

To make use of some exceptionally large classrooms, Superintendent John Kennedy, of Batavia, New York, in 1898, placed two teachers in a room, one to conduct the class exercise and the other to assist pupils at their desks. This proved so helpful to the poorer students that the system was extended to rooms with only one teacher. This has come to be known

as the Batavia system. It is still practiced in one form or another in various school systems. "The time schedule of the elementary schools of Mount Vernon, New York, allows an hour a day in each grade for individual work, during which time the teacher who has learned how to individualize her teaching may meet and work with children as individuals while the other members of the class are engaged upon profitable class work." (Superintendent Holmes in Whipple, '25, 33.)

In some other school systems this problem is met by assigning a coaching teacher to each large building or teaching unit. It is the duty of this teacher not only to assist those that have fallen behind, but to administer tests to the pupils, to visit homes, and to resort to any other means of discovering the reason for their deficiency. That is, the teacher is an educational diagnostician as well as a coaching teacher.

4. *Differentiated assignments.* Differentiated assignments, such as were described in Chapter XX, have as their main purpose the meeting of individual differences. Instead of moving along faster, the abler pupils are given more work to do. The assignments are usually given in three stages. All must complete the first stage, but doing this even to perfection will usually net no grade higher than C. To earn a B, the second stage must be completed in a satisfactory manner, and to earn an A, the third stage must be so completed. Even after that a final examination must be successfully passed. Doing all three stages of an assignment does not guarantee an A or a B. Quality of work is not sacrificed for quantity.

In the South Philadelphia High School for Girls, where the Dalton Laboratory Plan is in vogue, assignments are usually given in two stages, "A" and "B." "A" is on the textbook or basic classwork and "B" on supplementary material. The work under "A" is required of all, and is all that is expected of the weaker pupils, but if that is all a pupil has to offer, he

cannot grade higher than G. "The E's are reserved for those who prepare, on the average, one elective each week in addition to the textbook material." (Wilson, '26, 72.)

5. *Enrichment versus rapid progress.* The giving of differentiated assignments raises the question of what constitutes an adequate educational provision for differences in capacity. Should the work of the abler students be merely enriched, without varying the rate of progress? Should the primary emphasis be placed on differences in rates of progress? or, Should both factors be given specific recognition?

In actual practice both factors have always operated, regardless of theory. Even when no specific attempt is made toward enrichment, the abler students always get a richer educational product, other things being equal. They get more out of the basic class work and they often read more widely, if given only a little encouragement. Always and everywhere, too, the abler pupils have been helped along more rapidly. Double promotions are no new thing. Most teachers have always been pleased to assist able pupils so as to make this possible.

Charles Homer Haskins, the distinguished professor emeritus of history at Harvard, was granted his Ph.D. degree at the age of nineteen, and a fair percentage of other leaders in academic fields achieved their doctorates before the age of twenty-four. Had their programs through elementary and secondary education been merely enriched, they could not have done this. That slower progress would have been beneficial for them and for society is very doubtful.

6. *Individual instruction.* The devices that we have discussed so far all rest on the assumption that class work is basic and that individualization is supplementary. This assumption may be wrong. If it is granted that the teacher's responsibility is primarily to the individual pupil, it follows that in-

dividualization in education is basic and that class conferences are supplementary. This conclusion follows also from the undisputed fact that all learning is individual. Teaching is the stimulation and guidance of learning. Strictly speaking, we cannot teach classes, but only individuals, either individually or in classes.

This difference in viewpoint is very real, yet even when it is granted that individualization is basic, it does not follow that simultaneous instruction in classes has no place. Class work may still in many, if not most, types of work be the best means of reaching the individual. The criterion here, as elsewhere, is results. The inspiring influence of a class on both pupils and teacher is well known, and some lines of educative effort can quite obviously be pursued better in coöperation than individually. Teaching foreign languages by the direct method is distinctly enhanced by group work, although individual work may be done effectively between class periods. Where the development of social attitude is the objective, group work is clearly basic, yet even here we must recognize that it is the adaptation of individuals that we are aiming for.

It is usually stated that individual instruction prevailed down to the beginning of the nineteenth century, when it was gradually displaced by class instruction. This is true only so far as elementary and some secondary education are concerned. In universities class instruction by means of lectures has always prevailed. Both Plato and Aristotle taught classes and so did the sophists. William of Champeaux, Abélard, and others during the Middle Ages, attracted vast hordes to their lectures. In universities since that time the lecture method has always been the dominant method.

Individual instruction in the elements of education from the Middle Ages down to recent times appears to have been the result primarily of the type of subject-matter then in vogue.

The core of the curriculum consisted of Latin which was taught indirectly through grammar and translation, a method that lends itself well to individual procedure. As soon as the content subjects, such as geography, history, and science, came into the curriculum, class instruction began to appear. This appearance was slow at first, not merely because content subjects came in slowly, but because of the conservatism of teachers. It meant for them a radical change of habit in teaching, a habit that not only had become second nature to them, but that had the weight of long tradition behind it. Monroe ('07, 213) gives the schools of the Christian Brothers credit for bringing class instruction into general use and directing the attention of the educational world to it. These schools were started by Jean Baptiste de la Salle (1651–1719) in 1684. They spread rapidly throughout France and to some extent in other countries. They brought in a number of reforms, among them being the substitution of the class method of recitation for the prevailing individual method.

In the schools of the Jesuits and in the German gymnasium of that time some forms of class discussion also prevailed. These schools were often well graded and harbored large classes.

The monitorial system of Bell and of Lancaster, which was advanced during the closing years of the eighteenth century, and which was popular in this country during the first quarter of the nineteenth century, depended for its appeal on class instruction; that is what made it inexpensive. The pupils were carefully graded and were divided into groups of about ten, each group being taught by a selected older pupil known as a monitor.

With the incoming of the nineteenth century, class instruction soon swept the field. Its major argument was economy in education. Voices raised in protest against its universal

application were given no hearing. It cannot be denied that the spread of class instruction has played a large rôle in bringing the benefits of education to the people at large. Without it, costs would have been prohibitive and education would have remained a privilege of the few.

By the middle of the nineteenth century, class instruction was well established in this country, but it was not long after that when the complaint of "lock-step" began to be heard. The first to catch the ear of educators on this complaint was William T. Harris. In his reports as superintendent of the St. Louis schools in the later sixties and early seventies and before the National Education Association in 1872 he pointed out that, with all the advantages of class discussion, classes nevertheless tend "to unite pupils of widely different attainments." (*Proceedings*, N.E.A., '72, 266.) As a solution he suggested a highly flexible promotion system. Classes were to be only about six weeks apart so that gifted pupils could occasionally skip a class without much difficulty. A similar system of classification and promotion was inaugurated by Superintendent W. J. Shearer at Elizabeth, New Jersey, in 1886, where it continued in force well into the twentieth century.

7. *The Pueblo Plan.* The first vigorous return to the individualization of instruction was made by Preston W. Search while superintendent of schools at Pueblo, Colorado, from 1888 to 1894. To meet a complaint against an undue amount of home study, Mr. Search requested his teachers to have all studying done at school under their own immediate supervision. This led to an almost complete abolition of recitations. Each pupil worked along as rapidly as he could and no attempt was made to keep the members of a class together. Conferences with the teacher were held as needed, individually or in groups. The usual individual differences appeared, some pupils moving

ahead from two to four times as rapidly as others. The plan never spread very far, partly because the educational world in the nineties was not ready to give up class instruction, and partly because no technique for carrying it into effect was worked out. For one teacher to keep track of one hundred and fifty assignments a day without any special devices for checking up on them is too great a responsibility.

Mr. Search brought his plan to public attention in the *Educational Review* for February, 1894. From a historical standpoint this article is well worth reading. Mr. Search and his staff faced all the problems that the later experimenters in the individualization of instruction have faced. He spoke of the work as laboratory work, he recognized the need of individual records, he emphasized the importance of careful assignments, and he provided for occasional class conferences.

In 1901, Mr. Search presented an elaborated exposition of his plan in his book entitled *An Ideal School*. I read this book at the time and remember well how it was generally regarded — utopian but impractical. Few, if any, recognized it as a harbinger of coming events.

8. *Burk's "individual system."* A vigorous foe of the lock-step in education and a champion of individual instruction appeared in Frederick L. Burk, of the San Francisco State Normal School. In 1913, with the coöperation of the training-school staff, he had all the work from the kindergarten to the eighth grade placed on an individual basis. Each of the seven hundred pupils was given a copy of the course of study for each subject on his program. Class recitations were abandoned and no daily assignments were given. Pupils were directed, tested, and promoted individually.

Although Burk is no longer living, this system is still in operation in the training department of this school, now the San Francisco State Teachers College. A clear account of

the work is given in the *Twenty-Fourth Yearbook* of the National Society for the Study of Education, pages 60–77.

9. *The Winnetka Plan.* The individual system of Burk bids fair to go down in history under the name of the Winnetka Plan. The plan was adapted to a public school system and brought prominently to public attention by Carleton W. Washburne in the schools of Winnetka, Illinois, where he is the superintendent. Washburne received his inspiration from Burk on whose staff he was for several years as head of the department of science.

In Winnetka the curriculum is divided into two parts, the "common essentials," and "group and creative activities." About half of each forenoon and of each afternoon session is devoted to the common essentials and the rest of the time to group activities.

The common essentials cover what are sometimes called the tool subjects. They include arithmetic, reading, language, spelling, and the essentials of geography, history, and elementary science. The assumption is that all people need to know these subjects and that they need to know them in the same way. Spelling, the relations of number, and the facts of geography, history, and science are alike for all.

Group activities include "field trips; opportunities to develop appreciation of art, music, or literature; discussion of live issues; self-government; dramatization; handwork of all kinds; and group projects." (Washburne in Whipple, '25, 264.) The point is stressed that these activities "are to be given as much dignity and importance in the school curriculum as is the mastery of the tools." It is a basic function of these activities to assist in the development of social personality.

Individual instruction is restricted to the teaching of the common essentials. Each subject is divided into units of achievement called goals, and self-instructive study manuals,

similar to correspondence school lessons, are in the hands of the pupils. These have been prepared specifically for the occasion and lead forward very gradually in their demands on the learner.

A goal takes from a few days to several weeks to complete. After a pupil feels that he has mastered one, he tests himself on self-corrective questions or problems contained in the study manual.

> If he finds that he has mastered it, that his practice is 100 per cent right, he asks the teacher for a real test. This test the teacher corrects. If it is not 100 per cent, the child practices again on the weak points shown by it, then asks for a retest. When he shows the teacher that the goal is mastered, he works on toward the next goal.
>
> The teacher, under this plan, spends her whole time teaching, not listening to recitations. She helps an individual here or a group there; she encourages and supervises. She is about among the children as they work, not at her desk.
>
> No child ever "fails." Nor does one ever "skip a grade." If in June a child has not finished his grade's work, in September he goes on from where he left off. If a child can do more than a grade's work in a year, he does so, but he does *all* work, without skipping any.
>
> During the half of the morning and half of the afternoon devoted to group and creative activities, the children are not working toward any set goals, nor are they tested. Going into one of the rooms during this part of the day, one may find the children dramatizing a part of their history work. Perhaps they are putting on a very informal impromptu dramatization, or perhaps they are preparing a more elaborate one which may be presented to the school as a whole during assembly. The assembly is a sort of open forum.
>
> By providing flexibility of time for the mastery of common essentials and by providing opportunity for children to exercise and use their different interests and abilities, the Winnetka schools are adapting the curriculum to the individual differences that exist among children. (Washburne in Whipple, '25, 80–82.)

10. *The Dalton Plan.* The Dalton Laboratory Plan was conceived by Miss Helen Parkhurst. It received its name from the tryout it was given in the high school of Dalton, Massachusetts, in 1920, where it is still in force. Miss Parkhurst ('22, 8) ascribes her primary inspiration for devising the plan to the reading of Swift's *Mind in the Making* in 1908.

In Miss Parkhurst's own school, the Children's University School of New York City, the morning is divided into three periods, two short and one long. First comes an organization period of fifteen to thirty minutes, next a laboratory period of two to three hours, and finally a conference period of thirty to forty minutes.

The main work is done in the laboratory periods. Above the third grade, the work is departmentalized and teachers become subject specialists, as they do in platoon schools and in junior and senior high schools. Each teacher's room is known as a laboratory for a particular subject.

Assignments are made in sections covering normally twenty days of work. These are known as contracts or jobs. In a school year of nine months, each subject is divided into nine jobs. Each job contains twenty units of work, or one for each day. The units, as well as the uniform length of the jobs, arise out of administrative convenience. By means of the units both teachers and pupils are enabled to keep definite track of the progress that is being made. They need not interfere with the coherence of the work.

All assignments are duplicated for the pupils and are made in helpful detail. Before they are given out, they are considered in conference by the teachers and, wherever possible, they are correlated. A paper in history may count as a composition in English. After they are given out, they are discussed in a conference period with the pupils so as to make their meaning

clear. After that the pupils are allowed great freedom in attacking them. During laboratory time, they are free to move from laboratory to laboratory without asking permission. If a pupil wishes to complete his twenty-unit job in one subject before he attacks those in his other subjects, he is privileged to do so. He may move along as rapidly as he is capable and still do his work well. If he can complete his entire allotment of jobs in less than twenty days, so much the better; if he needs more than twenty days, he may have the extra time. He is, however, not given another set of jobs until all in the preceding set have been completed. This completion is attested by successfully passing examinations set by the teachers in the various subjects.

Records are kept on graphs, of which there are two kinds, one for the teacher, which is the class progress graph, and one for each pupil, which is the individual progress graph. Before leaving a laboratory, a pupil is required to record his progress both on the teacher's graph and on his own. That enables the teacher always to tell where each of his pupils stands, and the pupils can tell how they are progressing in respect to the time available.

Studying is done in the subject laboratory or in the library. Pupils may work individually or in groups. The work done in the laboratory is informally supervised by the teacher. As the teacher is a specialist and has charge of the same type of work in several grades, there may be pupils doing widely different types of work in the laboratory at the same time. The members of each class are given an assigned place in the laboratory so that children with common interests may be together.

The conference period set for the last thirty or forty minutes of the forenoon is given over to a discussion of some of the work recently covered. Conferences are held according to a posted schedule. On Monday a grade may meet in geography,

on Tuesday in history, on Wednesday in English, on Thursday in science, and on Friday in mathematics.

These conferences, which come once a week, are not normally the time for the presentation of new material. For this purpose the teacher may call a special presentation conference that is held during the laboratory period. When such a conference is in progress, a sign is put on the laboratory door, saying, "This laboratory is closed." Not more than two presentation conferences may be held for a single grade in any one forenoon. When two have been announced on the bulletin board, others must be held on a later date. When a teacher wishes to take a class on a field trip for an entire morning, he puts up a sign, "Laboratory closed," and goes off with his class. This need not inconvenience other pupils having work with this teacher, for they may work in other laboratories in the meantime.

In some Dalton schools the forenoons are devoted to the basic subjects and the afternoons to physical training, industrial and household arts, dramatic work, field trips, and other group activities, a division similar to that found in Winnetka. In the Children's University School, however, the laboratory idea has been extended to all the subjects. This removes the dividing line between individual work and group work. The work in any laboratory may be either individual or social, as the nature of the subject-matter demands. The school has laboratories for art, music, English, French, science, and two for social science (history and geography combined), as well as a theater and a library.

Unlike the Winnetka Plan, in which special textbooks are used, the Dalton Plan makes use of ordinary textbooks. This has no doubt been one factor that has aided the spread of the plan, for this plan has spread extensively, especially in England and on the continent of Europe.

Miss Parkhurst gives three principles as constituting the philosophy of the Dalton Plan. These are (1) freedom, (2) community living, and (3) budgeting of time.

By *freedom* is meant the privilege to pursue an interest without interruption by class changes every thirty or forty minutes. A pupil may work on one job as long as his interest holds, much as he may do in life.

Community living, or coöperative group life, is provided for by the subject laboratories. In each laboratory pupils from several grades or classes intermingle freely, they move from laboratory to laboratory as personally felt needs demand, and they coöperate in their work in a natural manner.

The reason for *budgeting time* is brought about by the long assignments that are made. This shifts the responsibility for the wise use of time from the teacher to the pupil. Unless the pupil budgets his time and makes an overt attempt to live within that budget, he is likely soon to find himself hopelessly behind. The pupils are given definite instruction on how to budget their time, and they may occasionally be called to account, but the aim is made to keep their attention primarily on the work rather than on the externalities of time. (See Parkhurst in Whipple, '25.)

11. *Critical summary.* In meeting differences in capacity, individualization of instruction has made great strides since the announcement of the Pueblo Plan in 1894. These strides have been even greater on the theoretical side than on the practical. We now see more distinctly than before that all learning, and consequently all teaching, is ultimately individual. Individual instruction and class instruction are both means of reaching the individual. Both need a place in the schoolroom and as means both are equally fundamental in teaching. Now one and now the other may be in the ascendency. Differences in subject-matter and differences in chil-

dren alike indicate this. In mastering the fundamentals of arithmetical skill, individual work is essential; in bringing out the meanings of historical events, class discussion stands unrivaled. Dramatization is inherently coöperative. In no case is it desirable to have the slow student and the rapid student chained together.

A number of criticisms have been directed against both the Winnetka and the Dalton Plans (e.g., Kilpatrick in Whipple, '25, 273–286). In respect to the Winnetka Plan it has been said that the common essentials and group activities are kept too much apart in the schoolroom and that the common essentials are consequently taught in a formal, unrelated way. On paper it does look as if this criticism were just. It looks as if the tool subjects were taught from books quite unrelated to the feelings of actual need. This is denied by Mr. Washburne. He points out that there is no valid reason why all types of activities in school should correlate with one another; it is enough if they all correlate with life. (In Whipple, '26, 227.) That point is well taken. Life does give meaning to, and set the standard and need for, school achievement, *provided* the pupils appreciate the relationship. Whether or not the pupils do appreciate the relationship depends upon the teachers and the philosophy of instruction that prevails. If the teachers have their minds on realities rather than on books, if they have grasped the meaning of direct attack in teaching, then the chances are good that their teaching will be vital, functional, and meaningful, no matter what the plan of curriculum organization looks like on paper.

The criticism that has been directed against the apparent formal nature of the work in the tool subjects at Winnetka has been directed also against the jobs and examinations in the Dalton Plan. Written assignments, jobs, and examinations are formal things and may easily lead to formal and stereotyped

work, but here again it is the guiding hand that counts. If these things are kept strictly in their position as means, if the minds of the teachers and pupils are centered primarily on realities, meanings, and functions, verbalism need not ensue. It is quite likely, too, that as these plans mature and become more sure of their footing, the demarcations now found within them will soften. An innovation in its early stages must appear in bold outline and in bold relief. This is its means of challenging attention.

The charge has been made that both the Winnetka Plan and the Dalton Plan are guilty of the "cold storage" fallacy in education. This means that subject-matter is learned and taught, not because it is now actually needed and used, but because it may at some future time be needed, perhaps in adulthood. The fallacy is alleged to result from the divorce between the common essentials and meaningful activities in the Winnetka Plan and from the formal pursuit of jobs and examinations in the Dalton Plan.

This charge is easily overworked. When it comes to the elements of arithmetic, English, geography, history, and science, children find need for about the same subject-matter as adults do. They are living in the same world, they read the same news, and they listen, to a large extent, to the same conversations. They shop and market for themselves as well as for their parents. Biological and physical phenomena have for them the appeal of newness. The world of geography and the events of history, vitally presented, are to them both fascinating and interpretive.

What children can understand and can practically and culturally use is undoubtedly a basic question in curriculum construction, but after that we must put our trust in the vitality of instruction. Formal, verbalistic instruction does not even place the things learned in "cold storage" for future use. It

may produce a segment of personality that the vain may use to show off with, but unless the material is learned in a meaningful way, it is never likely to function in significant situations. The Misses Burchett and Beaudoux express the conclusion of high-school teachers generally when they say: "The ordinary child, on coming to high school, has no conception of grammar. He does not know the parts of speech. He is incapable of distinguishing the subject of a verb from its object." (In Wilson, '26, 117.) The chances are good, though, that this ordinary child had been taught formal grammar for several years in the elementary school. Formal arithmetic, formal geography, formal history, and formal science are equally futile. The fault is not with the pupil and, in the main, not with the curriculum, but with the teaching. Such teaching, the formal lesson-hearing type, yields a parrot-like repetition for the time being, but it places nothing in "cold storage" for future teachers to build upon. There appears to be no inherent reason why the teachers working under the Winnetka and the Dalton Plans cannot make their work as vital as those working under any other plan, including even those that are working in experimental activity schools, and they are at the same time meeting the requirements of differences in capacity. Each subject of study after the third grade must rest, in the main, on its own relations to life and on its own activities. Activities undertaken for socializing purposes or for vitalizing a particular subject are not likely to be extensively helpful in other subjects.

EXERCISES

1. What bearing has the size of the school system on ability grouping?
2. What appears to be the effect of ability grouping on the attitude of pupils?

3. Why do you suppose the Dalton Plan has been adopted more widely abroad than in America?
4. Class instruction is looked upon as advantageous by students because it aids them in getting their assignments. In Dalton schools students are usually not admitted to class conferences till their assignments have been worked up. (Wilson, '26, 89.) May these positions be reconciled?
5. "It can be shown that children can master knowledges and skills happily and satisfactorily without tying these up to projects. If the materials of instruction are so prepared as to show the children the relation of their knowledges and skills to real situations, there is no unusual difficulty about 'carry over.'" (Washburne, *Twenty-Sixth Yearbook*, 227.) What do "real situations" tie knowledge to?

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CHAPTER XXIII

GUIDANCE IN STUDY

1. *Problems involved.* Study on the part of pupils gives rise to two problems for teachers. These are: (1) getting pupils to grasp the principles of effective study, and (2) getting them to apply these principles in their work. The first is the problem of teaching pupils how to study, the second the problem of procedures in supervising or directing study.

2. *Study versus content.* The difference between teaching pupils history and teaching them how to study history is a difference in the direction of attention. In teaching history, the attention of both teacher and pupils is on the content in hand — on the facts and events of history, together with their relationships and significance. In teaching pupils how to study history, the attention is directed to the procedures used in mastering this content.

3. *Procedure in teaching study.* A good way to start pupils out on a reflective consideration of the art of study is to make use of a lesson that has been assigned and studied in the ordinary manner, but, instead of asking questions on the subject-matter, ask, What did you do in studying this lesson? This question may then be discussed orally, the points made being noted on the blackboard, or the pupils may be asked to write out everything they did. The latter will give the teacher much information in respect to the study habits of individual pupils that is likely to prove helpful later in supervising study. The discussion that is desirable for bringing into relief the aspects of procedure in study may then be undertaken at a subsequent period, after the teacher has had an opportunity to read the papers and correlate the points submitted.

4. *Aspects of study.* On their face the papers submitted by the pupils will list a large number of different things that are done by pupils in studying, perhaps upwards of twenty, but when differences in wording are allowed for and similar ideas are grouped, the number is greatly reduced, perhaps to less than twelve.

A. Topic or problem. In the discussion all are likely to agree that the first point of which the pupil should be conscious when beginning to study a lesson is, What is it about? A good assignment will no doubt have brought this point into the foreground, but it is now the time for the pupils to become conscious of its importance. Unreflective pupils often plunge right into the study of a lesson without asking what it is about or what they expect to learn. If it is arithmetic, they will figure, and if it is history, they will memorize. McMurry ('09, 4) tells of a boy in his school whose ambition to study was temporarily aroused by a new book in history.

> He happened to be the first one called upon in the first recitation, and started off finely. But he soon stopped, in the middle of a sentence, and sat down. When I asked him what was the matter, he simply replied that that was as far as he had got. Then, on glancing at the book, I saw that he had been reproducing the text *verbatim*, and the last word that he had uttered was the last word on the first page.

Obviously this boy had taken no time off to reflect about specific purposes or to think of what questions he might find answered in the book. To him study meant "learning" the text. Awareness of purpose is so obviously an element in intelligent study, or intelligent work of any kind, that it requires no discussion in a class of teachers or prospective teachers. It is fairly obvious, too, to most elementary and secondary-school pupils, yet all of these pupils may profit from a meaningful discussion of the topic.

B. Bird's-eye view. Another point that many of the pupils will have mentioned in their papers is that they read the lesson over or that they tried to get a general or bird's-eye view of it. They will readily agree that, after one knows what the unit is about, one should get a preliminary view of the topic or unit in hand. This is desirable for apperceptive reasons. One cannot assimilate details till after one has the broad heads under which they belong. A person who wished to make a study of the history of Japan would be unwise to begin with a five-volume work or even with a five-hundred-page treatise; it would be far better if he began with a fifty-page synopsis of the main periods. That would give him his bearings and he would then be in a position to fill in the details as needed.

A rapid preliminary reading, or a scanning of the topical headings, serves the same purpose in the study of a lesson; it gives one the background into which to place the details. This is true not only in content subjects such as history and geography and biology, but also in formal subjects such as arithmetic and algebra. When meeting a problem in mathematics, it is well to scan it rapidly, disregarding the precise nature of the details, so as to note the principles involved in it. Once the pupil sees these, the details will fall into place readily enough.

C. Subdivisions. After the pupil has an outline view of the unit or problem in hand, he is ready to go after the details or subdivisions and master them in turn. Many of the pupils will, in various ways, have noted this point in their papers. They will have mentioned such things as the grouping of details, mastering the main points involved, and underlining important statements.

It is in this aspect, the third, to which the heart of effort in study must be devoted. It is here also that the procedure is the most varied. Working out how an automobile engine

works is in detail quite different from mastering the sequence of events in *Ivanhoe* or in the transition from medieval autocracy to modern democracy. The details of study in this phase are determined by the detailed nature of the subject-matter concerned. Teachers in each field need to give specific instruction in the art of study in their own subjects, but study procedures can never be made mechanical. Subject-matter and purposes vary perpetually, making it perpetually necessary for the pupil to use reflective intelligence.

It is in this third phase of the mastery of a unit that the pupil must learn to distinguish between assimilative material and the principles, interpretations, or adaptations that he is after. In all inductive exposition, details are given primarily for the purpose of giving meaning to the principle that the writer wishes to establish, although a few typical and outstanding details are always worth remembering so as to supply a factual basis for one's convictions. Thus, in the transition from medieval to modern times, it is well to remember the revival of learning, the Reformation, and the revolutions in England, France, Italy, Germany, and Spain, together with their bearing on the evolution of individual freedom.

In deductive exposition, the interpretation of details is the point to be grasped. This involves understanding rather than memory. We want to know *how* and *why* a suction pump works; a mere description of its operation will not suffice. In esthetic and social topics, attitude and life significance take precedence over details and give them meaning. An orgy of production, a boosting of prices, over-borrowing, and the erection of artificial barriers to trade are facts. Their significance is revealed by what they lead to. This significance should establish attitudes, and these attitudes should modify future procedures.

D. Summary. After the basic aspects or subdivisions of a

topic have been somewhat separately mastered, they need to be brought together again into a unified conception. The pupils will have mentioned this in their papers by saying that they had made an outline or a summary. It is this aspect that forms the capstone in organization. It applies to units of some scope and does not necessarily have a large place in a single day's assignment. It is here, no less than in the preliminary outline view, that pupils need to learn the nature of a unit as distinct from a fragment. Each of the four aspects of study that we have considered is, in a sense, a fragment; the four in relation form the skeleton of the unit. The summary is essentially the preliminary outline view made meaningful and thoroughly knit together.

We have, then, the following four aspects that may be recognized as basic in the study of a unit of knowledge.

A. Recognition of the topic or problem, including motive.

B. Scanning to get an outline view.

C. Mastery of the subdivisions, interpretations, details.

D. Summary and organization.

5. *Studying and teaching.* The reader is no doubt already aware that this outline for the mastery of a unit in study closely resembles the four-point outline for teaching particular topics developed in Chapter VI. They are, in principle, identical, and this is significant. Teaching a pupil how to study is teaching him how to teach himself. For this he needs to understand and apply the same principles and procedures that the teacher uses in the guidance of study through teaching. This identifies the theory underlying the art of study with the theory underlying the art of teaching. The recognition of this identity illuminates the whole problem of teaching pupils how to study. It relates this problem not only to the acquisition of knowledge, to which study is often implicitly restricted, but also to the acquisition of social and esthetic appreciations and

motor control, and to the development of these into understandings, attitudes, tastes, and skills. The theory and art of study must cover all the objectives of teaching and learning brought out in Chapters IV to XIV, not only those pertaining to knowledge brought out in Chapters IV to VIII.

6. *Variations with subject-matter.* To be logically complete, we should now relate all the principles and procedures brought out in Chapters IV to XIV to study, as they were there related to teaching, but this should, in detail, not be necessary. It would bring out little, if anything, that cannot be brought out just as well, if not better, in class discussion. The question always is, What should the pupil be aware of for guiding the acquisition of knowledge, appreciation, or motor control, and for fixing these objectives into permanent, expanding, and functional acquisitions?

The fact that teaching is a give-and-take performance, a duet, and that study is largely a solo performance does introduce some differences between teaching and independent study. To the extent that knowledge is sought from books, which is the main source of knowledge in elementary and secondary schools, it involves the use of only the four-point outline. The teacher uses the five-point outline in a full sense only when engaged in developmental teaching. This is a give-and-take procedure resting on data that the pupils have already informally acquired or that they must acquire through experience or through reading for the occasion. The relationship involved is for the pupils an original problem. In schools using the method of direct attack, pupils do face this type of problem occasionally, both in the natural and in the social sciences, and when they do they may well be taught what these problems involve. All thought problems, inductive or deductive, involve particular instances, a hypothesis, and a conclusion which unites the instances with the hypothesis.

Knowing this should make them more self-helpful in dealing with problems that are for them original, yet of most of the children in our elementary and secondary schools not much should be expected in this line. There are always some who surprise us by their originality, but, in the main, problems of this type belong to the graduate school where problems that are as yet unsolved are supposed to be met. Life is too short for students to rediscover, even under guidance, everything that the race has learned so far.

In books, inductive and deductive problems are of necessity solved by expository rather than by developmental treatment. What the critical student needs to look for in this treatment are: (1) the problem, (2) the solution, and (3) the data or grounds on which this solution is based. Then he may ask, Are the data adequate to support the conclusion beyond doubt? Is the argument convincing?

This brings us to the problem of developing the critical attitude of students in their study. This involves judging either the worth-whileness or the soundness of statements, two entirely different things. Many textbooks and treatises contain material that may be classed as padding or drivel, and students may well be taught to recognize this. They should see that this material might with benefit be either omitted or greatly condensed. The opening paragraphs of technical treatises and of articles in professional journals are seldom worth reading. If superfluous material from treatises, textbooks, articles, and discussions were omitted, much time would be saved and effectiveness increased.

Judging the soundness of statements is a different and far more difficult problem. It is easier in the field of propaganda than in the field of scholarship. Adults have become suspicious and critical of all social and political propaganda, and children are not slow in adopting the same critical attitude.

What they should be taught to look out for are questionable assumptions and a partial or one-sided presentation of facts and principles. The person who argues glibly for a communistic scheme of life usually assumes that people are much alike and all but forgets individual differences and their significance in society. By presenting only a part of the facts, almost any person may be made to appear either as a saint or as a sinner.

To criticize the conclusions of scholars in their specialties requires a high degree of scholarship as a basis. Even so, students should learn to recognize the data on which writers rest their conclusions and to judge their adequacy. In books on psychology, education, sociology, and economics, conclusions often rest on very slender foundations. Not many years ago it was generally agreed among psychologists that the elements in feeling were affections and that there were only two varieties, pleasantness and unpleasantness. No factual evidence for the conclusion was ever presented, nor is it ever likely to be presented. Even a college sophomore can pass judgment on that type of scholarship.

Literature, art, and music involve, in their intellectual aspect, the same points that the natural and social sciences involve, but they involve, in addition, setting and attitude. To become self-reliant in the pursuit and enjoyment of the arts, the pupils must learn to reflect on what art is and what its rôle in life is. Setting is usually important, and students should learn to give it adequate consideration. In literature, the judgment of fidelity to life is often important. All these things are continually being taken care of in the assignment and in class discussion, but in developing independence in study pupils need to be made aware of them, much as teachers are aware of them.

In developing acts of skill under their own guidance, pupils need to appreciate the importance of good form, of the direct

attack or the omission of scaffolding, and of consistent and motivated practice. Good form and correct execution are often difficult to acquire without expert guidance. A student who wishes to learn to typewrite, to play the violin, or to speak French by himself should be told to engage for himself an expert tutor. Only in that way can he be sure of making a right start. Any other course is likely to involve him in much imperfection and discouragement. Consistent practice or drill is so obviously necessary that no student can overlook it and get anywhere.

In making principles, laws, rules, definitions, and items of particular knowledge fully their own, once they are understood, the pupils need to appreciate the importance of using them. In mastering generalizations, artificial and even abstract practice exercises are not to be despised. Thinking, talking, reading, and writing about items that one is mastering are all forms of using them. Opportunities for using them in these ways must at first be sought out; they can be made. Later, living a life of culture in attending lectures, in conversation, in reading, and in reflection should be enough to keep the essentials of one's knowledge alive. Once adequately grasped, basic understandings are relatively permanent.

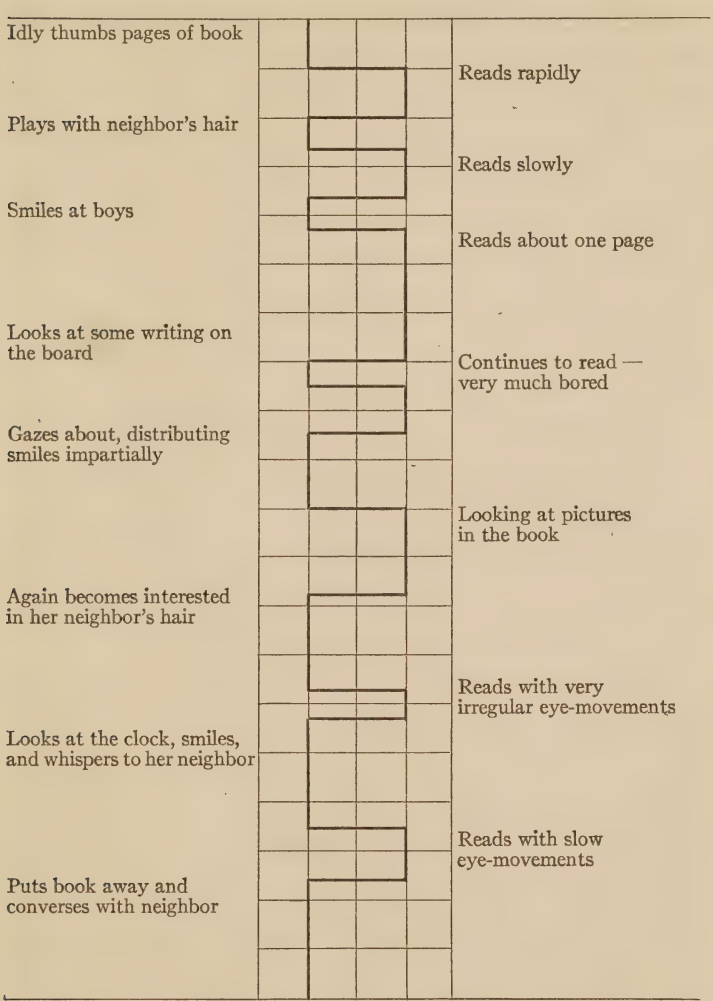
7. *Practical suggestions.* For best results in study, one needs a moderately quiet place, with the conditions of temperature and light normal. Studying in one place where the needed materials are properly arranged, and where there is no distracting material, helps one in getting to work quickly and acquiring the power to concentrate. Many students find a definite schedule of work helpful and time-saving. Those who are irritated by a time schedule, who feel that it puts them into a strait-jacket, are probably just the ones who ought to acquire system in their work; they may be merely in the grip of inferior habits. Yet this is not certain. It may not be

true that all persons can do their best by systematic application. For some the best system may be no system. Consider Rousseau and Whistler, as examples. If anyone thinks he belongs to this class, it is up to him to justify it by producing something. He has a right to his own "system," but teachers and others expect results.

No work is satisfying unless it brings results. The pupil, beginning with the elementary school, should be led to realize that the way to get satisfaction out of school work is to pursue it vigorously and attain the stage of mastery. Many pupils have trouble in getting started on the study of a lesson or on the writing of a theme. The way to start is to start. Go through the motions at least and soon you will be down to something substantial. Make an outline; write something down; especially stop thinking about a lot of other things that you might be doing or about what John or Mabel said last night. Granted good health and rest, mind-wandering is a habit; no normal person needs to tolerate it within himself when he ought to be at work. He can take himself in hand, "get mad with himself" if necessary, and treat himself as he knows he ought to be treated. The person who is ill, who is fatigued, or who is worried, is fighting against odds that may be too great. He needs first to take steps to have the causes for his condition removed, but after that it is up to him. He can use his will power if he really wants to. He needs a goal in which he is really interested and he needs to have respect for himself. "Whatever thou doest, do it with thy might."

8. *Attention graphs.* To assist students in overcoming mind-wandering, Morrison ('31, 141 f.) suggests that the teacher have the work habits of such pupils graphed and then talk the graphs over with them. An attention graph of an eighth-grade girl studying at her desk is shown on page 407.

Attention Graph[1]


Idly thumbs pages of book
Plays with neighbor's hair
Smiles at boys
Looks at some writing on the board
Gazes about, distributing smiles impartially
Again becomes interested in her neighbor's hair
Looks at the clock, smiles, and whispers to her neighbor
Puts book away and converses with neighbor
Reads rapidly
Reads slowly
Reads about one page
Continues to read — very much bored
Looking at pictures in the book
Reads with very irregular eye-movements
Reads with slow eye-movements

[1] From H. C. Morrison, *The Practice of Teaching in the Secondary School* (1931), p. 143. Reproduced by permission of the University of Chicago Press.

This graph represents a period of twenty minutes. Sixty-one per cent of the time was spent in distraction and the other thirty-nine per cent might almost as well have been. Morrison shows that talking over such a graph with a pupil may bring about marked improvement in concentration. Graphs may be taken at intervals and the pupil shown his improvement.

Cases of poor concentration are often cases that require diagnostic treatment. For them merely to see a picture of themselves may not be enough. Conditions such as health, rest, or diet may require attention.

In making an attention graph, the teacher needs the assistance of a competent helper. Obviously the pupil must not know that he is being observed.

9. *Supervised study.* Along with gaining an understanding of the theory of study, pupils need also to be taught how to apply this theory so as to produce effective work. Inductive studies by Breslich ('12), Breed ('19), Brown and Worthington ('24), and Butterweck ('26) have shown that pupils vary widely in the amount of specific training in study that they need. The ideal always is to develop the ability of independent study, and the quicker this condition is reached, the better.

Breslich found that under supervised study, classes as a whole made a slight average gain in the measured results of their work and that the poorer students profited particularly. Breed, whose study covered 596 pupils divided into 34 classes under 3 subjects in 14 high schools, concluded that "supervised study of the kind tested facilitated the progress of the poorer pupils, and to a correspondingly greater degree retarded the progress of the better pupils." It was slightly less efficient in algebra, much less efficient in English composition, but much more efficient in first-year Latin than unsupervised study. Brown and Worthington, whose experiment covered nine parallel classes — nine supervised and nine unsupervised—

found surprisingly little difference in the results obtained from the two procedures. Failures were slightly reduced by supervised study, showing again that the poorer students are helped by it, but some of the bright students felt that their time was being wasted. Butterweck's study compared the effectiveness of two procedures in teaching pupils how to study. Two groups of paired pupils were used. One group was given the theory with only illustrative practice; the other was taught to study by the practice method, theory, however, not being omitted. Among his conclusions are:

> Pupils of high intelligence can generally be depended upon to translate information into action if the activity is properly motivated and the pupils are held strictly accountable for a certain degree of mastery; pupils of low intelligence need a great deal of practice material used in its proper setting and consisting of the elements of a given study situation arranged in the order in which they are to be used in their ordinary study. Both groups of students are materially helped by an analysis of a study situation into its elements and the presentation of these elements to the class. ('26, 78.)

That is, teaching pupils how to study by giving them a masterful understanding of the factors involved is helpful to all pupils alike, but giving them extensive supervised practice in study is helpful only to those of low intelligence; to those of high intelligence this may actually be harmful. This comes as no surprise to observant teachers, for they have always noticed that the person of high ability needs only to be freed for action while the one of low ability needs not only to be told and shown what to do, but told and shown and told and shown. This is all in line with Elbert Hubbard's classic utterance on initiative, which reads in part:

> And what is Initiative? I'll tell you.
> It is doing the right thing without being told.

But next to doing the right thing without being told is to do it when you are told once. That is to say, carry the Message to Garcia!

There are those who never do a thing until they are told twice. Such get no honors and small pay.

Next there are those who do the right thing only when necessity kicks them from behind, and those get indifference instead of honors, and a pittance for pay.

Then still lower down the scale than this, we have the fellow who will not do the right thing even when someone goes along and shows him how, and stays to see that he does it. He is always out of a job, and receives the contempt he deserves.

The fact that study habits are quickly acquired makes it desirable, if not necessary, that teaching pupils how to study should parallel the use of books. It should begin in the elementary school when books are beginning to be used. Many elementary-school teachers appreciate this and are giving conscientious attention to it. A pupil who has developed poor habits of study and yet has been promoted presents a difficult problem when he reaches the junior or senior high school. He has a whole system of habits to displace and it is hard to get him to see the need for this, for hasn't he been getting along?

By the time the senior high school is reached, study procedures should have become intelligent and good study habits should be well established. Even after that is generally true, some students will still be graduating from high school and will be getting into college without efficient study habits. For this the schools cannot be held solely responsible. Neither the school nor any other agency, nor all agencies combined, can remove all human inefficiency from the world. For this, nothing short of a change in the plan of creation would be adequate.

Little has been written on the technique that is most helpful in raising the efficiency of study to higher levels. It is

not to be expected that there is one universally applicable technique, except this: the cases of pupils who have not responded to the instruction in the art of study must be analyzed individually. Individual help cannot be intelligently given till after the case has been diagnosed and the difficulty located. This requires sympathy, patience, and practical intelligence. Once the difficulty is known, psychological and pedagogical principles should suggest a solution. It would be helpful if teachers who are successful in improving pupils' study habits would keep detailed records of the various cases met with and of the procedures that proved successful. The publication of such material would undoubtedly prove helpful to many a beginner in the art of supervising study.

10. *Administrative problems.* The fact that pupils profit very differently from supervised study sets a difficult problem for the administration of this procedure. All may with profit be taught the factors in effective study, but only those of low ability need to draw upon the teacher's time for supervision and training in study. Where ability grouping prevails, teachers should have little difficulty in adapting themselves to the needs of their respective classes, but where ability grouping does not prevail, assistance in study must be rendered largely individually or in special groups. In some places the study coach is now rendering this service, and where instruction rests largely on an individual basis, the class teachers are rendering it. Administrative organization that provides supervised study for all is not to be recommended. The lengthened class period may still be desirable in junior and senior high schools, provided that this is not allowed to interfere with the initiative and self-reliance of pupils. All pupils, including those of low ability, need to be thrown on their own as much as possible. The goal all along is for the teacher to make himself needless.

11. *Home study.* Attention to supervised study in its

present form appears to have been suggested by the poor results frequently obtained from home study (see Breslich, '12). On this topic there is much difference of opinion, that of teachers and parents both being divided. Some in both groups would have more of it and some would have none of it.

It has been shown again and again that the conditions for study in many homes is very poor and that it is good in few. Yet many pupils would rather do most of their studying at home than in school. They appear to find the distractions in the home less than the distractions of other pupils in school. Many parents find home study an aid in keeping their children off the streets.

When the schools opened at nine and closed at four, there was little need for home study, the school day was long enough; but with the schools closing at three, the school day has become too short for the advanced pupils to include all their preparatory work. In junior and senior high schools, furthermore, most of the periods that are free from basic class work are used for gymnastics, music, art, and supervised extra-curriculum activities. That leaves little time for the preparation of lessons.

In respect to the available time of pupils, school officials, including teachers, should remember that many pupils are taking private music lessons, that others are taking lessons in art and rhythmic expression, that others are working after school, and that all should play in the open air at least two hours a day, participate in the activities of their families, and go to bed early. There is some danger of making the lives of some children too strenuous.

As conditions now stand, home study is with us and we should therefore give it pedagogical attention. The rule to be laid down is that all home work should be done independently; that no personal help from members of the family or

others should be accepted. This can be achieved by assigning the right kind of home work. All basic teaching should be done by the teacher in school. That leaves drill and memory work, application exercises and problems, supplementary reading, and reading in literature that may be done at home. This work should, as a matter of proper pedagogical procedure, be done by the pupil independently. If occasionally there is a problem that he cannot do, let him take it back to the teacher. There may be others who had difficulty with the same problem, indicating that supplementary teaching is required. For a pupil to realize that home work is up to him and not to his father or mother, brother or sister, is just the stimulus for independence that some pupils require. Much of the home work, as now conducted, does pupils little good. The only ones who profit by it are the parents.

EXERCISES

1. To what extent is memorizing involved in study? Give examples.
2. What do you understand by "spoon feeding" in education? Any relation to supervised study?
3. What appear to be the causes of mind wandering? How may the ability to concentrate be developed?
4. Point out how the assignment and the class discussion should, incidentally at least, teach pupils how to study.
5. How do temperature, light, sounds, bodily position, bodily condition, and companionship affect the quality of your study?
6. What can you say in favor of a supervised study period for those who need it after the regular school day has closed?
7. What types of reading are involved in study? How may the ability to scan be developed? To read rapidly? To read reflectively?
8. Explain: "The technique of supervising study is but the technique of good teaching applied more explicitly and, in some cases, individually." (Burton, '29, 390.)

9. Point out that activity schools, Dalton schools, and some others, require no separate provision for supervised study. Is this the ideal to be striven for?
10. System and orderliness are factors that are conducive to efficiency in all lines of work. How may these factors be incorporated into one's study procedure? What is your system of study?
11. Select a textbook on the theory of teaching and examine it for material that might either be omitted or condensed. If the book contains such material, how may it be distinguished from assimilative material?
12. Sandwick ('15, 41) says: "Study aloud or with lips moving in order (1) to strengthen attention and hold the mind upon the work in hand, and (2) to strengthen the memory by providing more mediums of recall." What is your reaction to this advice?
13. The following reasons for supervised study have been advanced. Do you agree with them?
    a. Home study tends toward irregular habits of work.
    b. Pupils are helped unwisely by parents and friends.
    c. Individual differences demand individual methods of help.
    d. Increases efficiency of school work and reduces failures.
    What arguments against supervised study can you advance?

SELECTED READINGS

Book, F. W. *Learning How to Study*, etc., 339–355.
Burton, W. H. *Nature and Direction of Learning*, 368–395.
Crawford, C. C. *Technique of Study*, 319–338.
Earhart, L. B. *Teaching Children to Study*, 1–50.
Headley, L. A. *How to Study in College*, 353–374.
Kornhauser, A. W. *How to Study*, 1–42.
Lyman, R. L. *The Mind at Work*, 297–330.
McMurry, F. M. *How to Study*, etc., 3–27.
Monroe, W. S. *Directing Learning in the High School*, 405–440.
Parker, S. C. *Methods of Teaching in High School*, 391–417.
Sandwick, R. L. *How to Study*, 5–81.
Whipple, G. M. *How to Study Effectively*, 1–44.

CHAPTER XXIV

TESTS AND EXAMINATIONS

1. *Functions of tests.* After a teacher has taught and a student has studied, they both want to know if the objectives striven for have been attained. To give this knowledge is the function of tests and measurements in education. This function, however, extends distinctly beyond the satisfaction of curiosity. The results obtained serve at least four large purposes. These are:

(1) To furnish both teacher and pupils diagnostic evidence for guidance in further work.

(2) To give parents information in respect to the quality of their children's work.

(3) To furnish data for administrative purposes: promotion, classification, transfer, granting honors, etc.

(4) To furnish data as a basis for educational and vocational guidance.

(1) Both teachers and pupils need to know the extent to which the work upon which they have been engaged has been mastered. Without this knowledge, imperfections cannot be corrected and future work is not likely to be improved. A person who shoots at a target, but never stops to ascertain where he hit, is not likely to improve his marksmanship. In all lines of work, a knowledge of results is an indispensable condition for improvement. This principle has been extensively demonstrated in our psychological laboratories.

The diagnostic function of tests relates them closely to the teaching-learning process. They are an integral part of this process and are helpful to both teachers and pupils. If this were not true, they would have no basic place in the schoolroom.

For pupils, tests form a culmination of the learning process; they clinch the nail, as it were. Without them they feel that they have been given no definite indication of their attainment and that the work has been left at loose ends. After a period of study, pupils need to know if they are on the right track and if they are getting what is fundamental or what is expected of them.

Without tests, teachers would have no means of checking up on their own work. Beginning teachers may well look upon tests as a primary means of raising their own work to higher levels. These teachers are prone to expect results altogether too rapidly. They need to learn to adapt themselves to the learning rates and processes of children. They need to learn what aspects of a subject cause special difficulties and how they may best help children over these difficulties.

All teachers need tests for diagnosing the difficulties of particular pupils. After most of the pupils have mastered a unit, there are usually a few who need special attention. To serve these pupils, test results must sometimes be analyzed in detail. There may be some small point, such as handling a particular type of fraction, that a pupil is stumbling over. More frequently it is some basic rule or principle that has not been mastered.

When a test reveals that more than a tenth of a class has failed to grasp a certain principle or process, it is an indication that the point should be retaught. It is here that Morrison's "mastery formula" ('31, 81) comes in: "Pre-test, teach, test the result, adapt procedure, teach and test again to the point of actual learning." To one reteaching, all may usually be subjected with profit, but after that reteaching had better be restricted to the few who need it, perhaps on an individual basis.

The diagnostic use of tests in teaching has in recent years

been given much careful attention. For a further discussion of this topic the reader is referred to Burton, '29, 538–555.

(2) Parents have a natural and legitimate interest in the progress that their children are making. Tests yield one type of information that may be transmitted to them.

(3) Tests of all kinds, mental as well as educational, furnish data that are useful for administrative purposes. The modern school administrator is a person who wants to proceed in the light of full information. The type of information that is being recorded is expanding rather than contracting. It is being made cumulative, passing along with the pupil as he moves up through the school system, and is continually being added to. By the time the pupil reaches the high school, or graduates therefrom, this record gives an exceptionally helpful picture of the pupil's abilities, interests, achievements, ambitions, personality, health, family connections, and so on. The reader should see in this connection *Progress Report IV* (November, 1931) of the Carnegie Foundation for the Advancement of Teaching, made in coöperation with the Joint Commission of the Association of Pennsylvania College Presidents and the State Department of Public Instruction.

(4) The guidance value of a cumulative school record is slowly being recognized. The abilities, interests, ambitions, and achievements revealed through a series of years plot a curve in a definite direction. An interest in science and mathematics may point toward engineering; an interest in history, politics, and writing may point toward journalism. For selective college admission such a record becomes a safer guide than any one battery of examinations.

2. *Tests and motivation.* A function of tests usually mentioned, but omitted in the foregoing list, is the motivating function. That tests and examinations do serve this function is only too obvious; it cannot be avoided; but the problem is

not how to use this function, but how to throttle it down. Tests are not given for motivating purposes, or when they are, they are being misused. When this function is emphasized tests are almost sure to get between the student and his subject-matter. They become ends rather than means. This interferes with the vitality of the pupil's learning no matter how splendid the teaching may be in other respects. It interferes with the pupil's attitude toward his work. For wholesome results his mind must be centered primarily on the subject-matter and its significance and not on some generic by-product. It is the motivating effect of examinations and the disturbances that follow in the wake of this effect that constitute the strongest argument for the abolition of formal examinations. There is no reason, though, why a tactful teacher should not be able to use tests and examinations without having them become a liability rather than an asset in learning and health.

With the exception of giving standardized tests for administrative purposes, formal examinations have no place in the elementary school and only a small place in the high school.

3. *Relation of tests to study.* If tests and examinations are to serve the functions that we have outlined, and if they are to help rather than to interfere with sound learning, they must be both intelligently planned and intelligently given. The teacher must realize that the nature of the examinations that he gives determines the nature of the study that the students do more than any other one thing that he does. It cannot be otherwise. The examination sets a hurdle that the students must pass in order to stay in the running, and they will do all they can to anticipate the nature of that hurdle and prepare to meet it. They will study the teacher quite as much as the book. Butterweck ('26, 2) expressed a great truth when he

said, "Study is a pupil activity of the type required to satisfy the philosophy of education held by the teacher." The term "philosophy of education," however, is often altogether too pretentious a term to use in this connection.

In response to the question, What is the effect of tests and examinations on sound learning? one of my students, a teacher, wrote:

> The effect that any examination has depends on what kind it is, whether true-false, completion, or essay. Each type calls forth a different method of study. The typical way of preparing for a true-false test is to read the text and ask yourself at the end of every line or so — How could this material be put into a true-false question? At the end of a couple of hours of study, all that is in your head is a jumble of isolated facts completely lacking in coherence. Almost the same holds true of studying for a completion test. Here, instead of a jumble of sentences, you have a jumble of important words with letters carefully counted. You are prepared for a mechanical puzzle. You have meaningless details because you have nothing to hold them together with — they are not related to any whole.
>
> On the other hand, we have the essay type which, I believe, exemplifies a better kind of examination from the standpoint of study. In studying for an essay examination you read your material, organize it, unify and integrate it. You gain a complete survey of the material and in so doing, you see it as a whole with interrelated parts. When examinations make us think, reason, survey, organize, integrate, and work for worthy perspectives of the course as a whole, they further sound learning; when they make us like sponges they hinder sound learning.

4. *Tests and the objectives of teaching.* In the intelligent planning of tests and examinations, the teacher must be clearly conscious of the objectives that he has been aiming to reach in his teaching and then frame his questions, problems, and other stimuli so that the responses will reveal whether the objec-

tives have been acquired or not. The trouble with much of our poor testing, as with our poor teaching, does not lie in the teachers' technique of testing, as such, but in their hazy or perverted conceptions of the nature and outcomes of teaching and learning. A sound theory of testing involves the entire theory of education and teaching as discussed in the first nineteen chapters of this book, assuming that this is sound.

A student's mastery of a generalization is tested, not by his ability to reproduce it, but by his ability to explain and to use it. The person who can use the fundamental processes — fractions, decimals, and denominate numbers — in solving the problems that people are likely to meet in their lives has mastered the rules of arithmetic. The person who can use the rules and definitions of grammar so as to correct his own written English has an adequate mastery of that subject. Mastery of principles, laws, rules, and definitions are, on the whole, rather easily tested in a vital manner, distinctly more easily than a mastery of particular facts and events.

A generalization or a procedure can be tested in at least three stages. The questions are: Can you state it? Can you explain it? Can you apply or use it?

The principle of the condensation of water vapor is stated by saying that vapor condenses into water when cooled below the dew-point for a given humidity, and it is explained, measurably at least, by relating it to the kinetic theory of gases. To apply it is what usually taxes the capacity of a student most. After developing this principle, as is done in Chapter IV, ask the members of even a college class to apply it by explaining the formation of dew. Dew will still "fall" for many of them!

Exercise 3, page 72, is a problem that calls for the application of the inductive procedure, (1) to the development of a definition, and (2) to the development of a related group of

principles. Students find this much more difficult to do than to explain the procedure in general terms.

It has been objected that tests in the application of generalizations do not test knowledge but ability; that they are psychological rather than educational in nature. This objection could, in a measure, be directed against all educational tests. The objection reveals a static rather than a dynamic educational philosophy. An ability is a compound of native capacity to do, or to learn to do, and the guiding knowledge that has been acquired. Dynamic education involves both and measures both. The school official who wants a teacher that is likely to manifest intelligence in his work wants a teacher who has demonstrated a facile ability to apply theory to practical problems.

To devise tests calling for the repetition of particular items of knowledge is easy; far too easy for the general good. A certain amount of factual testing in history, geography, science, and English is, no doubt, in place, but this is easily overdone. It is the meaning of particular things and events that make them significant. Events or phenomena have causes and consequences. These relate them to scientific principles and to life's values. They are best tested for in their relations.

Particular things are either so significant that they are worth knowing for themselves, or they are mere assimilative material, having little significance beyond supporting the generalization toward which they point. The masterpieces of art and literature; the leading countries, rivers, and mountains of the world; and the outstanding events of history are worth knowing for several reasons; but these things are so interwoven with life and are so meaningful that they need not be tested for in isolation. Such questions as the following call for understanding as well as information and test both at the same time.

(*a*) Compare Mexico with the United States in respect to location, climate, resources, industries, people, and population.
(*b*) By what routes may an article be shipped from Chicago by water to seaports?
(*c*) What is the "Monroe Doctrine," what led up to it, and what have been its leading effects?
(*d*) Justify the statement that medieval culture belonged to the static-authoritative stage of civilization.

All of these questions indirectly test facts as well as understanding. Facts are needed as a basis for the understanding.

Every large generalization has an array of data to support it, but once the generalization is clearly understood, only a few of the outstanding items of data need to be remembered. What is the doctrine of evolution? What is a vestigial organ? What is the law of diminishing return? A student should be able to cite a few facts under each of these, but to ask him to give a list of ten or more is evidence of a perverted sense of importance. Data here may be interesting because they are curious, but they are significant only because they have meaning.

Testing understanding in mathematics is in principle the same as testing understanding in other subjects. Mathematical skill, manifested by speed and accuracy, may to some extent be tested along with understanding and the power to apply, but if separate measures for speed and for accuracy are to be recorded, separate tests must be used. Abilities in manual training, drawing, and penmanship are appropriately tested by judging the product in relation to some standard, such as a penmanship scale. Singing, playing an instrument, and gymnastic feats must be judged by someone who is personally competent.

Foreign language control is properly tested only by demonstrating the ability to use the language. Understanding the

language in written or spoken form may be tested by reproducing the thought, just as is done in testing reading ability and understanding in English. Translation is not necessary and should be avoided whenever possible. Answers are best given in the foreign tongue. Testing ability to compose must be done just as in English, by letting the student write something. A few simple questions on grammar may come in during the first and second years, but such questions belong logically to the later stages of language control.

Testing in the esthetic subjects is still in an unsatisfactory state of development. I have before me a standardized test in English for upper high-school grades and colleges. The section on literature contains one hundred multiple-choice questions, not one of which calls for a reaction revealing appreciation or for the understanding of a literary theme. They all call for small items, many of them trivial, that *may* reveal whether the examinee has read the selection or not, but that is all. The type of study that the prospect of such a test induces is the saddest aspect to contemplate.

Tests and examinations in literature are constructed as if literature were a knowledge type, instead of an appreciation type, subject. The person who knows most *about* a selection — its history, its facts, and its technicalities — is rated the highest. The essay, as a rule, does belong to the knowledge type.

Some historical, geographical, biographical, sociological, and natural-scientific knowledge is needed for the understanding of many literary masterpieces and so may be called for in tests, but the main part of such tests logically belongs to themes and motifs and to reactions to these. These are just the things that are dealt with in appropriate class discussion in this field.

A twelve-year-old in the City and Country School of New

York, after reading the *Odyssey*, wrote the following review for the guidance of other children:

> It is a wonderful book. It's about a man that went to fight in the Trojan war and a storm wrecked his ship and he did not come home till nearly twenty years later. He went away and left his wife and little baby. He was gone so long that they thought that he was dead. So all the men of the land came to woo his wife. But she would not marry any of them. She said that they would have to wait till she finished the web she was weaving. So by day she would weave and by night she would unravel. She kept doing this for three years till one of her ladies in waiting told. And she had to finish the web. He came home twenty years after and he and his son killed the wooers and lived happy till they died. It's the best book I *ever* read. Odysseus was the man, Telemachus was the son, and Penelope was the wife. (Stott, '27, 90.)

This reaction reveals both the pupil's attitude or appreciation and her understanding of the theme. Without realizing it, the child has given the best test result that one could ask and no one need hesitate to assign her an "A," if a mark is required in the scheme of things.

The difficulty of testing appreciation appears to be greatly overestimated. All that is needed to bring out a student's attitude is to give him a chance to express himself in a natural way. This is usually what he is eager to do. Have you read Longfellow's *Psalm of Life*? What do you think of it? is the type of question that brings it out. If the selection has a story, as *Evangeline*, that may also be called for in outline.

A person reveals his attitudes both in his lines and between his lines. Orally he adds to this his facial expression, his gestures, and his quality of voice. Appreciation is as easy to gage as understanding, and nearly as easy to grade. The grade of high, medium, or low is usually sufficient and that is not hard to judge. The direction that the appreciation takes

may also be worth noting. Is it of character? Of adventure? Of fidelity to life? Of esthetic effect? Or of what?

A knowledge of what pupils appreciate is helpful in understanding them and in guiding them educationally. On the cumulative record blanks it is sufficient to record their interests. The practice of not marking the work in literature, dramatics, singing, and in other creative activities has much to recommend it.

A record of the spontaneous reading that pupils do furnishes another illuminating datum for gaging literary adaptation. Such records are being extensively made and they reveal much. For a series of years they reveal especially literary taste, expansion of interest, and growth to higher levels of appreciation, or lack of such growth.

The teacher who is mindful of the outcomes that children ought to get from education, who is aware of the knowledges, appreciations, and skills that count in life, is not likely to go far astray either in his teaching or in his testing.

5. *Ways of giving tests.* The manner of giving tests is a large factor in keeping them vital and wholesome. Most teachers and schools make altogether too much of a separate and distinct ordeal of them. If tests are to function as an integral phase of the learning-teaching process, the giving of them must be largely indistinguishable from other phases of teaching. The separate examination week that we have in many of our high schools and in nearly all of our colleges is an institution that could well be dispensed with. It places examinations rather than education into the foreground of attention and puts a premium on postponing study to the end of the term. It is leading to the allotment of block-week, a week without class meetings preceding examination week, so that the students may have a chance to study without interference by teachers. If this is sound, it might be well to al-

ternate teaching weeks and study weeks throughout the year, but to make this effective we should have to assign every third week to the giving of finals!

In all courses, such as history, economics, and zoölogy, which cover large but integrated units of work, a final examination of the right sort is undoubtedly valuable for the organization and interpretation of the unit as a whole. To achieve this end effectively, the student needs to have in his hands either a set of comprehensive questions, questions that call for the basic insights to be derived from the course, or an outline. Without such questions or outline the student's preparation for the examination is likely to be a blind groping and grasping with emphasis on memorizing. Study questions and outlines induce a more enlightened and efficient form of study, and they help to remove the dread of the unknown from the coming ordeal.

Many teachers are discovering that examination questions of the right sort may be taken home by the students and answered at their leisure, when they have time to sit down and think. Questions in interpretation and application and problems in mathematics and other subjects are all of this sort. The student may use his notes, text, and any other references he wishes. In examinations involving problems, students need to be pledged against the use of personal aid, but in other forms they need merely to be pledged to organize and write their own answers; no opportunities for learning of any kind need to be excluded.

This makes the taking of an examination about as natural as the writing of a paper for publication. The four questions on page 422 could all be used in this way, as could also many of the problems and exercises given at the close of the chapters in this and other texts. Questions of origins and developments in history lend themselves especially well to this treat-

ment. In the history of education, for example, a student may be asked to trace the development of elementary education before the Reformation; the use of the vernacular in education; the development of public education; and so on. The effect of tests like this on vital learning is obvious. The results are no harder to grade than if the papers had been written during an examination period. They vary just as widely in merit.

A college instructor in English used the following two questions as a home examination in seventeenth-century literature:

I. Imagine yourself a young man of the early seventeenth century who has come up from Oxford to the Inns of Court. You are interested in literature and men of letters. Write a diary telling something of the authors you have met, of the books you have bought in St. Paul's Churchyard and your opinion of them, of the poetry circulated in manuscript, of the poetry you are writing.

II. For each author studied this term, select a passage which you believe shows his essential quality. Explain why you have chosen the passage.

Questions for home preparation need not all be left to the end of the term. One or two may be given out whenever a significant unit of work has been completed. Questions like this resemble topics for term papers which have long been in good standing and have counted in the students' final marks. The effectiveness of class reports may be estimated for record. In classes under a hundred, where the discussion method prevails, marks for class work may be recorded. All these records give the teacher an extensive basis for judging the student's ability and progress.

6. *Short-answer tests.* The Binet-Simon tests in psychology were the forerunner not only of an extensive development of objective tests in all phases of psychology, but also of the

development of similar tests in educational subject-matter. These tests are known as *short-answer* or *new-type* tests when made by teachers for their own use, and as *standardized tests* when they have been standardized by extensive trials before they are given out for general use. Being standardized means, in part, that we know from trials what students for whom the tests are intended can do with them. We already have the range and distribution of scores made by a large and unselected group.

Short-answer tests, whether standardized or not, are prepared in a variety of forms. They are classified by Ruch and Stoddard ('27, 266) as follows:

I. Recall Types
  (1) Simple recall questions
  (2) Completion exercises

II. Recognition Types
  (1) Multiple response
  (2) True-false
  (3) Matching exercises
  (4) Best answer or judgment tests
  (5) Identification exercises
  (6) Rearrangement tests

Examples

I. (1) Simple recall

Washington was born Mo. —— da. —— yr. ——.
Lincoln's Secretary of War was ——
Madison is the capital of ——

(2) Completion

The —— function of tests relates them closely to the —— = —— process.

II. (1) Multiple response (encircle right word)

A yew is a box, tree, sheep, flower
An etape is a step, ribbon, stockade, plateau
A rani is a queen, vessel, harness, game

(2) True-false (encircle T or F)

A dyne is a unit of measure in magnetism. T F
Water may be pumped any distance. T F
Short-answer questions are often debatable. T F

(3) Matching. Relate the items in the first column to those in the second by placing the number of the proper item in the first column before that of the second.

1. Andrew D. White	(5) First U.S. Commissioner of Education
2. William James	( ) Former U.S. Commissioner of Education
3. William T. Harris	( ) Former professor at Harvard
4. G. Stanley Hall	( ) First president of Cornell University
5. Henry Barnard	( ) Former president of Clark University

(4) Best answer

A. The actual content of history is found in,
.....*a.* Education for citizenship
.....*b.* History textbooks
.....*c.* The life and institutions of the past

B. The subject-matter of literature is concerned with
.....*a.* Prose and poetry
.....*b.* The environment, problems, and aspirations of man
.....*c.* The training of feeling and imagination

(5) Identification

Among the following names, check the names of the men who have been president of the United States:
a. James Buchanan
b. Daniel Webster
c. William Jennings Bryan
d. Andrew Johnson
e. Benjamin Harrison

(6) Rearrangement

Number the following men in chronological sequence:
Ratke Francis Bacon

Roger Bacon	Abélard
Comenius	Locke
Mulcaster	Basedow

As compared with the essay type, short-answer questions are easier to score and they are somewhat more objective. Sims found that "approximately seventy per cent of the [traditional] questions have the same inherent objectivity as new-type test items" ('32, 101). This varies from fifty-four per cent in the high school to eighty-two per cent in the elementary school. Short-answer questions, furthermore, sample a wider range of knowledge, and a pupil cannot side-step them and write about something else.

On the other hand, short-answer questions require more time, and perhaps more skill, to prepare, and they require duplication for the pupils. Their most serious shortcoming is that it is next to impossible to frame them so as to test appreciation, understanding, power to organize and express knowledge. For this reason they need to be liberally supplemented by thought questions and by problems. It is beginning to be recognized more and more that, while short-answer questions are suited to test certain phases of geography, history, civics, and natural history, they have little place in expository subjects like philosophy, psychology, sociology, economics, and the theory of education.

Recall questions may often be assumed to test understanding as well as memory. The right response to the following questions may be taken to indicate an insight into the principles of education:

(1) The two basic aspects of an acceptable aim of education are { *a.* (Objective) / *b.* (Subjective) }

(2) The twofold function of the school is { *a.* (To educate) / *b.* (To guide) }

So far no helpful place has been found for completion exercises in school. All they test is a certain form of ingenuity and a useless type of patience. They are puzzles, not tests.

Where indubitable fact is involved, true-false questions are good, but they are still altogether too frequently used in statements that are debatable. The statement, "Water may be pumped any distance," is not clearly enough stated to be answerable by "true" or "false"; and the statement, "Short-answer questions are often debatable," is debatable. Such questions should be thrown out.

Both matching exercises and best-answer tests measure power of discrimination as well as knowledge, especially the best-answer tests.

I have for some years experimented with short-answer tests in both the principles of education and the principles of teaching, but the results have not been satisfactory to me. I realize, of course, that both these subjects are expository, a type for which these tests are ill adapted. My aim has been to test approximately the same understandings by both the short-answer and the essay types. The Pearson coefficient of correlation hovers around .50. An analysis shows that for slightly more than half of the students there is close agreement between the two arrays of scores. The scores of those that diverge are the disturbing factors. The typical lesson-learner, who is weak on understanding, nearly always does well in the short-answer form and poorly in the essay form. More disturbing even are the scores of those who do well in the essay form and poorly in the short-answer form. They "stop to think," and that is often fatal in short-answer questions.

The most fundamental question that must be raised in respect to short-answer tests, as with essay tests, is, What kind of study is induced by using them? If they can be framed and used so as to induce a wholesome, mastery type of study, well

and good, but if they induce a memoriter type of lesson-learning, if they direct the mind of the student to the details rather than to relationships and understandings, their defect is serious. Even though they are easily applied in certain fields, they may still need the antidote of essay questions for educational reasons.

7. *Standardized tests and scales.* To the extent that standardized tests involve short-answer questions, what has been said about the one applies to the other also. Scales in penmanship, drawing, composition, and the like are obviously free from the pitfalls of the short answer. Tests in mathematics and science involve problem-solving, which is also free from the pitfalls of the short answer.

Standardized tests and scales unquestionably represent one of the most significant forward steps that has been taken in education within the past generation. They have already achieved worthy positions in teaching, in administration, and in research, and their usefulness is continually expanding. Before many years we may have uniform college qualifying examinations the country over. These, with the students' cumulative records, should solve the problem of college admission, and several others. Standardized tests and scales have grown so vast in extent and involve so many technicalities that their full consideration cannot here be undertaken. They have developed into separate courses of their own.

EXERCISES

1. Distinguish mental, achievement, diagnostic, and prognostic tests.
2. Under what conditions, if any, are unannounced written tests justifiable?
3. What data in respect to pupils should be kept on a cumulative record blank?

4. Assign three students to a side and debate: Formal examinations should be abolished.
5. What do reliability and validity mean in relation to educational measurements? (See Monroe, '27, 481.)
6. Point out how the scoring of thought questions and problems may be made quite objective.
7. Barring copying the work of another, how may examinations be so constructed as to prevent dishonesty?
8. How may marks for classwork and class reports be assigned without interfering with the spontaneity of the student?
9. Prepare two reasons for, and two against excusing students from the final examination because of a high class record.
10. Frame an indictment either for or against the essay type of examination. Do the same for the short-answer type. (See Douglass, '26, 366–377.)
11. Why do standardized tests have only limited usefulness in high school and college? (See Monroe '27, 494.) Is it likely that these limitations will soon be removed? Why, or why not?
12. Degrees of certainty undoubtedly vary but students seldom, if ever, use pure guessing in answering examination questions. If this is true, what about the right-minus-wrong method of scoring true-false tests?
13. What does it mean to "measure" something? Compare measuring length and mass with measuring intelligence, and achievement in arithmetic, geography, and history. Compare especially the units used. What in each case is the starting point?
14. In a standardized test on the whole range of high school literature about half of the questions call for details that no one but a specialist in literature would be likely to remember very long. What should such a test call for?
15. Point out the suggestions that the following contains for both teaching and testing. "The student who is going to go into business is not likely to care about the details of zoölogy or physics; but if he can feel, when he has completed a course, that he has secured nine or ten general principles in each of the

sciences, he will be encouraged to regard these as permanent elements of his intellectual equipment." (Judd, '15, 467.)

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CHAPTER XXV

MARKS AND MARKING

1. *Symbols used.* The symbols most commonly used for recording the final marks of students are:

A = Excellent	D = Passing
B = Superior	E = Condition
C = Average	F = Failure

A condition ("E") means that the student has the privilege of making up his deficiency without further class attendance; a failure ("F") that the subject must be repeated for credit. The other symbols are sufficiently explained by their legends. These symbols are supplemented by others, such as "I" or "Inc." for incomplete, and "W" for withdrawn.

The mark of "E" (condition) is helpful in respect to students who have mastered most of the units of a course, but are still insecure in respect to a few of them. It would be unfair either to pass or to fail these students. With a little more work under the teacher's guidance they can usually bring their work up to standard. Furthermore, some teachers find it embarrassing to have students listen to their stories twice.

In scattering places, symbols entirely different from those mentioned are used. Some places still use the percentage system, which we shall discuss later. Some use E = Excellent, G = Good, F = Fair, P = Poor, and U = Unsatisfactory. Others use E = Excellent, S = Superior, M = Medium, I = Inferior, and D = Deficient. Some use "D" for Distinguished. All this causes endless confusion and makes it necessary for every marking system to define its symbols. It should not be difficult to come to an agreement in this matter.

As brought out in the preceding chapter, marks serve a

number of important purposes in education. Teachers and pupils adjust the progress of their work by them; pupils are praised or blamed by them; they are promoted or held back by them; they are or are not granted honors by them; they are educationally and vocationally guided by them, and, when they leave school, marks follow them in recommendations for employment. In respect to this last point, marks have an unmistakable cash value. All these points combined attach to the assigning of marks a heavy responsibility. An error may ultimately result in a grave injustice to the individual and harm to society.

2. *Meaning of marks.* In the light of the mastery idea in education, what can marks mean? If all in a biology class know the basic plant and animal groups, understand the doctrine of evolution, the principles of heredity, and the like, why differentiate between them? Why not give them all an "A" and let them go?

If we were interested merely in what a person knows or does not know, this would be satisfactory, but we are seldom interested only in what a student knows, what ideas, adaptations, and skills he has acquired. We are far more interested in what he can do with this knowledge. We are interested in his abilities, for these are what really count in the world. With the same understandings, the same adaptations, or the same skills, people achieve highly varying degrees of success. Suppose all the students in a biology class actually have mastered the basic units of the course. All that this means so far is that all should pass. Give them a chance to do something with the conceptions and they will soon differentiate themselves into the "D," "C," "B," and "A" range. Marks above passing mean degrees of efficiency. The exceptional student in biology will see all around the conceptions concerned. He will himself think of their various applications in life and

will be able to explain them brilliantly. The "D" student is one who understands the conceptions meagerly, who recognizes most of the applications only after he is reminded of them, and who can write about them only in a few poverty-stricken sentences. Yet both have mastered the conceptions. There isn't anything that "A" understands that "D" doesn't also understand, provided you jog his memory or let him follow in the footsteps of "A."

When we think of marks as indicating degrees of efficiency in the functioning of knowledge, attitudes, and skills, the various marks may be given fairly definite meanings. "D" means that mastery has been attained, but that the person as yet, owing to lack of capacity, lack of application, or partly to both, can only just meet the demands of social or vocational life in respect to his mastered objective. He knows enough about the principles of heredity to understand references to them and to explain them to his mother, but he is soon beyond his depth when thrown with a group of biologists.

The meaning of passing and other marks is most easily exemplified with a vocational skill, such as typewriting or shorthand. To hold an office position at all, one should be able to type with a high degree of accuracy a minimum of forty words a minute. That may be looked upon as representing a "D." Higher marks indicate abilities to render correspondingly more efficient service.

Typewriting is a skill subject, but the element of skill in various forms is present in everything that we test. We are not primarily interested in static knowledge and attitudes. We always want to know what a person can do in conversation, in holding his tongue, in being friendly, in enjoying music, in explaining physics, or in applying knowledge to practical problems.

A grade of "A" means that the student is outstanding and

exceptional in the ability under consideration. He can not only do the task well, but easily. Where another student may take two hours to master a conception, "A" takes thirty minutes. Mere mastery is the same in both, but it does not take long to discover significant differences between the two.

The mark of "C" indicates a quality of work that can be done by the median run of satisfactory workers. "B" includes those who are near-excellent; they are better than "C," but fall short of "A." "D" includes a group of people who are exasperating. In the occupations of life they are not bad enough to discharge and they are not good enough to keep. They are equally hopeless in school, especially when their deficiency rests on low capacity. They understand, in a way, but their ideas are meager and they easily go off on wrong tangents. They may be wordy, but very diffuse.

This interpretation of marks tallies with our classification of efficiencies in life. We have a few persons in business and the professions whom we do not hesitate to designate as outstanding or excellent, although in life it is doubtful that we would give this designation to as many as seven per cent. There are more whom we are willing to designate as superior, and there are many, close to fifty per cent, whom we class as successful but not outstanding. They correspond to our school range of "C." The "D's" we have also in life, and there are the failures. In life it seems that the number of failures is greater than the number of excellents, but that depends altogether upon the standards adopted.

The teacher should learn to recognize the typical achievement in expository expression by the elementary-school child, the high-school pupil, the college student, and the ripened scholar. A few college students are still on the elementary-school level of thought, many are still on the high-school level, but occasionally one will gladden your heart by a manifestation

of genuine scholarly attainment. Students may often be helped to attain higher levels, once they understand what the levels are and where they are.

School marks, as a rule, do not stand for something simple and are not so regarded. An "A" assigned to different students in the same class in biology does not mean that these students are alike; that they have the same efficiencies. One's outstanding characteristic may be originality, another's may be thoroughness and accuracy in work, and another's, power to apply in practical situations. Only when we test something so relatively simple as speed or accuracy in adding do the same marks mean approximately the same thing.

If marks mean mastery plus a number of other things, could we not, and should we not, designate each thing separately? Something like that is suggested by Morrison ('31, 63). He says:

> In our laboratory practice, we have lately been using M, N, and R to stand for "mastery," "sustained interest," and "self-dependence" respectively. Thus MN signifies at once a pupil who reveals mastery plus demonstrated interest in the course he is pursuing; MNR stands for mastery plus interest plus characteristic self-dependence. Other letters would have done just as well, and we might go farther and add sundry designations to indicate various other acquired qualities.

If marks were the only information we had about students, something like what Morrison suggests should undoubtedly be followed, but it is more and more becoming the custom to make record of a number of other things as well. Estimates of dependability, originality, thoroughness, and the like, are also being recorded. To let the marks in each subject indicate all these points in relation to the individual student's efficiency in that subject would make marks very cumbersome.

3. *Making marks more reliable.* The importance of marks

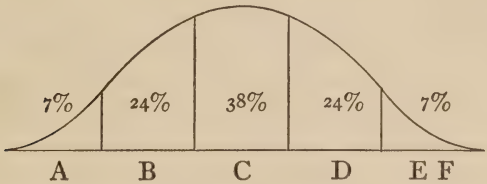
raises the double question of standardizing them and of assigning them with accuracy. If we could measure abilities, attitudes, and skills as accurately as we can measure length, weight, and temperature, we should have nothing to worry about, but this we cannot now do and shall not be able to do for a long time to come, if ever. There are, however, two aids that the teacher may use for gaining greater accuracy in marking. These are standardized tests and the normal surface of frequency.

4. *Standardized tests.* If standardized tests and scales were available for the assignment of final marks in all subjects, the responsibility for assigning particular marks would be shifted from the shoulders of the teacher. Such tests and scales are available in penmanship, spelling, reading, arithmetic, and in a few other elementary and secondary-school subjects, but they are not available in most secondary-school subjects and in practically no college subjects. In fact, few final marks anywhere are now based entirely on standardized tests.

To the extent that standardized tests can be used, it is obvious that the responsibility for fairness and accuracy in marking is not removed, but only shifted. It is shifted to the person or persons who make the tests and to the persons who adopt them. Such tests may give us unequivocal scores, but they may be lacking in both reliability and validity, especially the latter. An intellectual test on detailed facts about literature is not likely to give us a reliable measure of literary insight and appreciation. But these shortcomings are known to our experts, who are working to overcome them, with slowly increasing success. In time we shall no doubt have standardized tests of high validity in many fields, with a corresponding increase in the reliability of our marks.

5. *The normal curve.* To the extent that standardized tests are not available, teachers can get helpful guidance from the

normal or usual distribution of marks. Psychologists have extensively demonstrated that human abilities, like many other things in nature, are distributed according to a symmetrical, bell-shaped curve. There is a large number of cases around the median with an equal tapering toward both ends. When the base of the curve is divided into five equal parts, the percentage of cases falling into each section is approximately as follows:



Others favor slightly different numbers, as the following:

A	B	C	D	E and F
6%	22	44	22	6
3%	22	50	22	3
10%	20	40	20	10

As no plan of distribution is to be applied mechanically, these all mean the same thing in practice. They mean that with a large number of students we should normally expect to find relatively few who are either exceptionally good or exceptionally poor, more who are either superior or who are poor but passing, and many, from forty to fifty per cent, who cluster about the median.

Marks actually assigned by large numbers of teachers to large numbers of students do approximate the normal surface of frequency fairly well, as the following examples show. The figures in this table stand for the percentages of marks assigned either in one semester or in one year in the arts and science work.

	A	B	C	D	EF	Misc.
Harvard	7	21	43	22	7	
Chicago	13	35	36	8	3	5
Wisconsin	16	40	26	12	6	
George Washington	14	29	32	12	8	5

With the exception of Harvard, the distribution of marks in all of these universities skews toward the higher end. This is variously accounted for. Some say that many teachers, especially above the freshman year when the students are beginning to be recognized as sensible and sensitive human beings, give the benefit of the doubt rather freely to the student. This avoids complaints and dispenses more pleasure. Others maintain that the school system is selective and that the skewed curve in college is the result of the fact that the poorer students have dropped out. Still others maintain that the chase after marks is like a race, with most of the contestants clustering up front, and with relatively few straggling along behind. Each one sounds reasonable and each may have a part in skewing the curve.

Another cause of skewing is found in the way the marks are named in some places. Ideally marks should indicate fact only, implying no moral attributes; but this ideal is violated when marks, for example, read: Excellent, Good, Fair, Poor, and Unsatisfactory, as they do in at least one of the universities in the above list. The teacher hesitates to apply to a student a label that carries with it moral blame. A letter or a number is neutral, but a word or an initial letter clearly standing for a word is not. A "C" may be of more moral credit to one student than "B" is to another. If the student needs admonition in respect to his work, the teacher may administer that personally.

Furthermore, in the designations mentioned, the word "Good," which is synonymous with "Average" or "Medium"

in many minds, is given a position so as to cover both superior and average work. This naturally tends to skew the curve upward. "Fair," when used as above, is generally understood to mean just above poor, either "P +" or "C−."

If marks would measure achievement impersonally and accurately, it is very likely true that the normal curve would approximate rather closely in most large groups.

6. *Function of the curve.* How can the normal surface of frequency help the teacher in standardizing his marks? Certainly not by arbitrarily assigning 7 per cent A's, 24 per cent B's, 38 per cent C's, 24 per cent D's, and 7 per cent E's or F's. That would be procrustean. Procrustes was a legendary Greek robber whose custom it was to make his captives fit a certain bed that he had. If they were too short, he stretched them, and if they were too long, he sawed off enough at the pedal extremity. It appears that some teachers make their classes fit the normal curve in a similar manner with equally painful results.

The first point to be grasped by teachers is that when students' work is carefully evaluated and marked, the marks, in the long run, when arrayed, do approximately fit the normal curve. The curve has not suggested the distribution of marks; the distribution of marks has suggested the curve as the ideal distribution toward which accurate marking tends. This means that teachers must build up in their minds reliable standards of what "A" work is, what "B" work is, and so on. With some experience, this is not especially difficult, even though there are no indisputable objective standards against which different teachers may check. Teachers in their own fields soon learn to recognize excellent work, good work, or poor work.

When a teacher finds that his distribution of marks is varying rather widely from the normal curve, he needs to check

up on himself. There may be a sound reason for it, and if there is, he should stand by it. If there is not, he should analyze his case and learn to estimate or test the quality of students' work more accurately. Perhaps his examinations are at fault. A good examination is sufficiently varied and difficult to challenge the ability of every student, yet easy enough for every student to do something. Examinations that are too easy fail to differentiate the good students and those that are too hard fail to differentiate the poor ones.

Marking students "A," "B," "C," and "D" has been objected to as being undemocratic because it arranges students in a hierarchy. This objection would be sound if teachers actually aimed to rank students in respect to one another and if they made them conscious of this rank, but few teachers do either. All they do is to estimate the quality of their work. This corresponds precisely with what we have to do continually in life. Before one engages a typist, a carpenter, a dentist, or a surgeon, he wants to know something about the quality of his work. If marking is done intelligently, the question of producing a hierarchy is not directly involved.

7. *Deviations from the curve.* We have noted several times that one should expect an array of marks to approximate the normal surface of frequency only in the long run. This means that there should be many cases, at least one hundred. In a smaller number of cases it cannot be expected that every range of ability will be proportionately represented. In a class of twenty, five may be doing "A" work, four "B" work, three "C" work, three "D" work, and five may be failing. It is the actual achievement that must be evaluated, no matter what the size of the class is. Several years ago I had a class of thirteen, eleven of whose names began with "L." Eleven might just as logically have been "B" students, or of any other one range of ability.

Even a large group that has been highly selected may have the ability that we are measuring truly represented by a distinctly skewed curve. We can expect the normal surface of frequency to be approximated only when we are dealing with sufficiently large and relatively unselected groups, and then only when we are testing a complex of abilities. When we are testing a single ability, or a very narrow range, in which pupils have been specifically trained, we should expect all to make very similar scores. All the members of a class that has been drilled for a month to spell one hundred words should spell these words correctly. We should certainly feel that something ought to be investigated if the spelling ranged from fifty to one hundred in accordance with the normal surface of frequency. Memory facts in any subject may come under this head. An examination that appeals primarily to memory and for which pupils have had time to cram may yield a strongly skewed curve. Abilities to add, subtract, multiply, and divide may yield similar arrays of scores, provided the time factor is eliminated.

8. *Percentage grades.* Percentage grades are very generally interpreted to indicate the amount of work that has been learned or mastered. Seventy-five per cent is taken to mean that three fourths of it has been mastered, ninety per cent that nine tenths has been mastered, and so on. This is approximately true only where direct memory products are concerned. A student may have learned to spell seventy-five or ninety per cent of a given list of words, or he may have memorized eighty per cent of a poem. Where understanding or the ability to apply knowledge is concerned, this conception completely breaks down. There is no way of interpreting three fourths of an ability to understand or nine tenths of an ability to apply. Percentage marks here mean just what letter marks mean. In schools where 60 means passing, 60–69 may be taken to cor-

respond to "D," 70–79 to "C," 80–89 to "B," and 90–100 to "A." Within these ranges they merely indicate finer distinctions. Changing the passing mark from 60 to 70, 75, or 80 need not mean anything. Passing in school should mean mastery adequate for the occasion, and the way it is indicated should in no way change this fact.

Experiments have shown that teachers cannot reliably distinguish the quality of papers on a numerical basis within a closer range than five to eight points. (See Starch, '27, 524.) That argues in favor of the letter system; yet it is true that teachers *feel* that they can make finer distinctions than "A," "B," "C," and "D" indicate. For that reason they are impelled to record such marks as "A −," "A," and "A +." This feeling, it seems, should be recognized and such marks should be recorded. In the long run they mean something. Percentage marks meet this situation.

Plus and minus signs after letter grades, or numerical marks, are further justified by the fact that abilities vary continuously. There are no real dividing lines between "A," "B," "C," and "D." Some papers fall, therefore, on the dividing lines and others right near these lines. Teachers are puzzled about which way to turn such papers. Using plus or minus signs relieves the situation very materially. Then, if an error has been made, the error is at least only a small one.

When the meaning of marks is understood, it makes little difference whether they are recorded in the form of letters or numbers. Numbers have the advantage of being more readily handled statistically. Before letter marks can be used statistically, they have to be changed to numbers. This gives less accurate scores than if the marks had been recorded in number form in the first place.

9. *Credit for quality.* The Catalogue of the University of Missouri for 1928–29, page 110, says:

> For each recitation hour for which the grade of Excellent is recorded, the student will receive twenty per cent additional credit. For each recitation hour for which the grade of Superior is recorded, he will receive ten per cent additional credit toward graduation. Students will be given ninety per cent of the normal credit toward graduation for each recitation hour for which the grade of Inferior is recorded.
>
> Those who are of superior ability and will devote their best energies to work will accomplish much more than the average student, and will be given for this not only honorable mention, but recognition of their accomplishments by additional credits.

Giving quantitative credit for qualitative achievement is known as credit for quality. The practice in a variety of forms is in force in a number of colleges and in some high schools, although this appeared to be less true in 1932 than it was in 1922. In a leading college for teachers, a course normally carrying two semester hours of credit yields three credits for students who earn the mark of Excellent. Is this practice sound educationally?

In partial answer to this question, the same Catalogue of the University of Missouri tells us that credit for quality is in force except in "the College of Engineering and the Schools of Fine Arts, Law, and Medicine, where the curricula are definitely prescribed" (page 110). That is, where the curriculum cannot very well be varied in quantity, the plan is not applied. Theoretically at least, can the scope of work for the same degree or diploma ever be considered as variable? If the principle is admitted, then variable to what extent?

It is clear that under this system an excellent student who receives extra credit for the quality of his work will complete for graduation a smaller number and range of courses than will a medium or poor student. If a student received a premium of twenty per cent on all of his work, he would receive one hundred and twenty semester hours of credit for completing

one hundred class hours. A student who received credit for only ninety per cent of the face value of his work would have to complete approximately one hundred and thirty-four class hours to receive one hundred and twenty semester hours of credit. If a student were to receive three hours of credit for every two completed in class, a condition quite unlikely in practice, he would receive one hundred and twenty semester hours of credit for eighty hours of attendance.

Acceptance of the principle that the curriculum in general education may be varied in scope inversely with the quality of the work indicates a formal or subjective, rather than an objective, conception of the nature of this curriculum. The various studies in a professional school are there for a purpose; they cannot be varied without impairing the student's education. A similar conception, it would seem, ought to hold in respect to the general curriculum. An A.B. degree, for example, ought, for one thing, to indicate a certain clearly conceived range of acquaintance with our civilization, allowing for individual differences a certain percentage of electives. Any other conception leaves no objective meaning to the curriculum.

A merit of credit for quality claimed by the University of Missouri Catalogue (page 110) is that it enables "the most able and industrious students to be graduated in less than the normal time." This is true, and, properly achieved, is a merit; but if the variation in the curriculum brought about by credit for quality is unjustifiable, then this particular method of saving time is also unjustifiable.

Granted good health and peace of mind, excellent students can easily complete a third more work than mediocre students. This means that they could complete twenty semester hours while the others are completing fifteen; and this means that they could complete the college course in three years while the others are taking four.

Assigning quantitative credit for quality in work is similar to giving credit in height for excess in weight to a fat man. The two cannot be measured by the same unit. Quantity in school work is measured both by the range of courses and by the credit in units per course. Differences in quality of work are measured by variations in marks. High marks signify more than "only honorable mention"; they have a guidance and even a cash value, as was brought out before. Even honorable mention is something; people seem to like it.

It may be retorted that a student who does better work in a course also does more work in that course. That depends, but suppose we grant it for a moment. This would still not affect the range of courses that may reasonably be expected to enter into a specific degree or diploma. It might give a person more French or more economics, but it would not give him any biology or any metaphysics.

But the assumption that a student who does better work also does more work need not hold. It does no doubt hold sometimes, but quite the reverse may hold also. After assigning a final mark of "A" to one student and "D" to another in psychology some years ago, I discovered, after the course was over, that the "D" student had read exceptionally widely and was apparently the most interested student in the class. For one thing, he had read both volumes of James's *Principles of Psychology*. It may have been this wealth of reading that reduced the quality of his work. At any rate, the "D" still stood, in my estimation. He had not digested and mastered the material, so far as I could discover.

The "A" student did little, if any, more than was required. He was majoring in mathematics of which he had a real appreciation. Everything that he took had to have the convincing clearness of mathematics before he would let the discussion pass. His papers evinced the same clarity and thoroughness

of understanding. The "D" student was majoring in an esthetic field, but no inferences are implied by this. Both of these students have made good in life.

Another reason for adopting the principle of credit for quality cited by the Missouri Catalogue is "in order to encourage students to do the best work of which they are capable" (page 110). Undoubtedly the giving of extra credit for high marks has a stimulating effect, but this is just the type of stimulation that needs to be throttled down rather than up, as was explained on page 417.

It appears, then, that the principle of granting credit for quality is unsound because (1) it attempts to equate things that are totally different in nature, (2) it varies the scope of the curriculum unjustifiably for the same degree or diploma and thus "saves time" in an unjustifiable manner, and (3) it introduces a spurious means of motivation.

10. *Quality points.* Credit for quality should not be confused with the granting of "honor" or "quality" points. Quality points assign no extra credits, but are used as a means of assuring at least a fair quality of work for graduation. Suppose an "A" carries three quality points, "B," two, "C," one, and "D," none. To be graduated, it is usually provided, a student must have been assigned at least as many quality points as he has earned semester hours of credit; that is, he must have a "C" average. This "C" average can be ascertained in several other ways equally well. A student who averages less than "C," even though all of his courses are passing, will not be graduated. Quality points are also frequently used as a basis for granting honors of various kinds.

11. *Scores and grades.* It is worth noting that the scores made on a test or examination need not be the same as the grades that may be assigned on the basis of these scores. Suppose that an examination in algebra yields scores ranging

from 40 to 98, with 69 as the median or average. Suppose that the class is of normal ability and that the passing mark set down for that school is 70. Does this mean that fully half should fail? By no means. To make the scores correspond to the grades, it is quite likely that the passing score should be 53 and that the median range of scores, "C," should extend from 64 to 76, with the other ranges to correspond. It must here be assumed, of course, that instruction has been efficient and that in the teacher's judgment the score of 53 corresponds to the usual conception of mastery in high-school algebra.

The point involved here is not what the passing mark should be in this or any other particular examination, but the fact that no two examinations made by teachers are likely to be pitched at the same degree of difficulty. In a college entrance examination in algebra a few years ago, taken by hundreds of students, only forty-eight per cent passed. The next year in the corresponding examination, but with different questions, ninety per cent passed. There is little doubt that most, perhaps all, of the difference was owing to the difference in the questions and not to the difference in the students. Those who took the first examination were in hard luck. Those who took the second may have had an excess of good luck.

To avoid this element of variability in questions, the returns from college entrance examination boards are now generally stated in percentile position. To be in the seventy-fifth percentile, for example, means that twenty-five in a hundred rank higher and that seventy-four rank lower. This is the way that returns from standardized mental and achievement tests are now also usually stated. This makes the returns comparable.

12. *Marking papers.* In holding to approximately the same standard in marking essay type answers, teachers may get aid from the following suggestions:

Mark all answers on a scale of 10, no matter how many questions are contained in the examination. This enables you to keep always the same standard in mind. The numbers 5, 6, 7, 8, and 9 will soon stand in your mind for definite types of achievement. The final score is readily reduced to a scale of 100 by adding a zero and dividing by the number of questions. With a little practice you can do that mentally.

Mark answer one in all papers first, then answer two, and so on. This is a nuisance, but it helps to maintain equality of standard. When more than one person participates in marking a set of papers, let each mark different answers, not different papers as a whole.

Mark all papers *incognito*. This enables you to keep your mind single on the quality of the work before you, uncomplicated by the personality of the student. I have been doing this conscientiously ever since a student, many years ago, after being in the third class with me, said, "Evidently you have sized me up as a 'C' student."

Read over two or three representative papers before marking any. That will give you the pitch. Mix these papers back into the pile. If later papers should cause you to change your standard somewhat, be sure to go back over the earlier papers to give them the benefit or penalty of your change.

Be on guard with excessively long papers. Length need not be a sign of vagueness and inefficiency, but it usually is, in papers just as in books. Very short papers are usually easy to grade. Brevity is a sign of either poverty of thought or exceptional efficiency.

As is true in all other aspects of teaching, the evaluation of students' work is achieved in the most satisfactory manner by going at it directly and simply, using common sense. Except in standardized tests, the teacher's personal judgment cannot be eliminated. He must develop in his mind standards

based on facts and principles in which he has confidence and which he can explain and justify to others.

EXERCISES

1. Why is it supposed to be better to give students their marks in letters than in percentages?
2. Point out that the passing mark in standardized tests must be determined as in other tests, somewhat arbitrarily.
3. Burton ('29, 520) defines the various grades of excellence in much more detail than is done in the text. Explain and evaluate his plan.
4. Granted that native traits are distributed according to the normal surface of frequency, does it follow that achievement will be so distributed?
5. A teacher was heard to assert, "The grades I assign are an affair purely between my students and myself; they concern no one else." Is that true?
6. What are the elements that go to make up quality in the various types of school work? In typing? Bricklaying? Teaching? Medicine? Salesmanship?
7. "School marks for a long time to come will be based on performance of subsidiary activities instead of upon the functioning of real learning." (Burton, '29, 529.) Do you agree?
8. In a college where the passing mark is 70, a student receives a mark of 64 in biology. He transfers to a college with a passing mark of 60. Should he now receive credit for biology?
9. "If the real learning products could be sharply defined and readily recognized, and if teachers considered actual learning instead of other items, then theoretically there would not be a specific passing grade." (Burton, '29, 528.) Do you agree?
10. May it be expected that normally students will get higher marks as they proceed from the freshman to the senior year? As they take elective courses? May we still expect the full range of marks even in graduate work? Why, or why not?
11. A college student, who was included in an educational survey and who had been given a failure in Spanish, made an excellent

score on a standardized test in Spanish. Inquiry revealed that he had taken four "cuts" when he was entitled to only three. On what should a final grade be based?

12. Compare the following with the meaning of marks brought out in the text: "When I give a student an 'A,' he has generally convinced me that he is either brilliant or exceedingly accurate. The 'B' is usually a hard worker, a faithful retainer of knowledge and the possessor of an orderly mind. A student who receives his 'C' in a course with me is almost invariably the type whose mental endowment is very ordinary, whose initiative is dangerously modest, who, as a matter of fact, is a well-meaning follower — never a leader. Before I record a 'D' for a student, I like to feel reasonably certain that the work is beyond his mental reach. When I label a student 'F,' I am not unaware that he may be a genius or a high-grade moron." (Middlebrook, '31, 509.)

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